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A Test of Efficiency for the Industrial Arts

Lillian S. Cushman, The School of Education, University of Chicago

PERSONALLY, I believe that art instruction does not belong to the public-school curriculum unless it helps children to think more clearly, to work more skillfully, to have better judgment in clothing, housing, and enjoying themselves. I assume that all teachers who are not mere bread winners feel that they are working for results that extend beyond the school.

The problems of the schoolroom itself, however, are apt to contract our view to its four walls. This tendency is so strong that it needs to be counteracted by very definite study of social conditions. Every community has its individual situation which should be understood. A visit to a child's home, to a nickel theater, or to the juvenile courtroom will sometimes do more good than a course in pedagogy. When I go into a factory and see the faces on which dull monotony is chiseling its depressing lines, I see my work in a different light. The endless procession of children takes on new significance as they appear in the parts cast for them in real life so that my responsibility assumes a gravity that arouses a spirit of altruism.

Jane Addams, with a keen and sympathetic discernment, analyzes some of the conditions which make a demand upon the school. I feel like quoting an entire chapter from "The Spirit of Youth and the City Streets." She speaks of the fact that in many city neighborhoods practically all the children of fourteen enter factories, that when the work itself offers nothing of interest and when no recreation is provided outside, the situation becomes unbearable, that the joy of youth is wellnigh extinguished and the young walk almost as wearily as the old, that the modern factory calls for an expenditure of nervous energy almost more than muscular effort. She says:

"Perhaps never before have young people been expected to work from motives so detached from direct emotional incentive. Never has the age of marriage been so delayed. Never has the work of youth been so separated from the family life and the public opinion of the community. Education alone can repair these losses. It alone has the power of organizing a child's activities with some reference to the life he will later lead and of giving him a *clue as to what to select and what to eliminate* when he comes into contact with contemporary social and industrial conditions."

I should like to take that last statement as my text, and as my reason for doing so her following plea, *"Until educators take hold of the situation, the rest of the community is powerless."* It is a temptation to discuss at length the social needs for better aesthetic standards and to show their intricate relations with moral conditions but I assume that as teachers we have the conviction and are more interested in ways and means.

As an art instructor I am frank to acknowledge that our work is sometimes so formal that it is rendered useless. I visited a seventh grade in which there were a number of retarded students. There is no greater menace to themselves and society than girls who are physically young women and mentally still children. They follow the lure of brightness as the baby reaches its hands for the sunbeam. The teacher who can direct this instinct in such a way that the girl can satisfy her emotional nature in the small matters of everyday existence has the surest way of leading her to safety. In that particular room there were many such cases and the teacher was having the class make perspective drawings of their schoolroom. It was extremely commonplace and three lessons were being spent on the work, which only a few seemed able to understand and in which none were interested. I hoped there might be an ulterior purpose like getting ready to plan a room for themselves. She gave as her reason, however, the statement that it was in the art outline. Of course, perspective naturally appears in a general art course, but in this particular case it took the place of something which should have been provided for more special needs. A course of study should be elastic and the teacher should always be alert and sensitive to these individual conditions. Otherwise those who need the greatest amount of definite help receive nothing. Do the teachers of sewing and manual training believe that their work should be creative? In theory, yes. In practice, often no. Why is this? Let them speak for themselves.

I asked the principal of an industrial school in a slum district whether they taught design in connection with their sewing. She replied, "No, I think it would be immoral to teach these little girls to put medallions into their underwear. I feel that they should be taught the beauty of a plain, neat garment and so we don't encourage anything fancy." At a conference of manual training teachers a speaker described the educational advantages of an experiment in which high school students engaged in the manufacture of plows. After dwelling with enthusiasm upon the merits of workmanship, he said, "When the plows were finished the boys made a

gold model," and with a tinge of sarcasm he added, "This was the art product, but it remained in a show case and was useless and soon passed out of mind, while the work in which the boys took pride was that which was placed upon the market." There seems to be a very common notion that the relation of art to industry may be expressed in terms of the fancy trimming or the gold plow—something altogether for show and entirely useless. Why was it that that principal did not realize that she was teaching the most fundamental part of design when she taught the beauty of the plain, neat garment? Why was it that the manual training man did not understand that the only art product of a plow factory would be the plow which first proved itself in the furrow and without superfluities or affectations expressed its purpose in every line of an honest steel frame?

These opinions voice a misconception if not an entire indifference to the relation of aesthetic qualities and industry. The aloofness of art from real life and the tendency of industry to sell its birth-right are results of a one sided experience and are probably due to a fundamental social condition which we all recognize. I refer to the rapid development of modern industry and the factory system. In the days of handicraft, time and skill required for elaboration automatically regulated their prodigal expenditure. The machine is so impersonal and so prolific that we are not conscious of the creative thought which is expressed in its product. In fact, where under the old regime everyone knew how things should be made, no one knows anything of raw material and processes of manufacture today. Things just grow at the department store.

In its largest sense design is the creative thought which is expressed in both fine and industrial art. Applied design is the expression of art in life. It is based on principles which govern the relation of technic and aesthetic qualities in the industries and fine arts. It includes architecture, sculpture, and painting, as well as the minor arts and industries.

Are you, reader, one of those who regard design as an effeminate weakness, a mere adjunct to the manly art of making joints? Let me emphasize the point that, whether we make a drawing or not, when we put materials together in any form we are designing in terms of those materials. Design is in other words the plan. It may be a borrowed plan. It may be beautiful or commonplace but if it has enough consistency to become a recognizable *thing,* it expresses the idea of some one. We can't escape that fact. We are forced back to a question of whether it is worth while to teach the student the principles of beautiful construction. How many teachers of sewing and manual training dictate the plan without bringing out any principles which would guide the student in the selection of what is appropriate or beautiful? How many of these teachers believe that standards of good taste are the mere passing whims of a small aristocracy of culture? Have we not met these opinions expressed frankly in words or unconsciously in schoolroom practice? And probably we art teachers have given them just cause to think so. The man who sets up his good joint as the chief end of the shop education has very likely seen designs that were impossible from the standpoint of real material. It will take sound preaching to prove to him that art not only accepts but demands his exact joint as one of the foundation stones of beautiful construction.

There is often a complete break between technical practice in the shop and matters which affect standards of daily life. The individual expresses his taste in dress and home furnishing which make up a large part of the minor arts and industries, and in his recreations. The community expresses its collective standards in public utilities, in civic designing, and in municipal and state architecture. Emerson says, "The larger experience of man discovers the identical nature appearing thru them all."

Out of the varied experiences of a people develops a common notion as to certain essential characteristics of beauty. The judgment is so universal that it is not to be confused with the tendencies of the hour. Aesthetic standards are the result of a selective process which distinguishes between "truth and opinion." Each generation seeks more or less consciously to conform to this ideal. The problem of the teacher is to find out what standards of good taste have resulted from the experience of the past, to determine the best way to apply them to present needs, to gain such power as will enable him to instruct others.

The first quality which general good taste requires in the industrial arts does not of itself constitute beauty. It is one of its elements. I refer to what is known as style. In nature the structure of a plant or animal expresses the character of each. Let me mention the iris and the strong vertical lines of growth are recalled. The tiger is synonymous with crouching, sinister power. The mind rejoices in a reasonable relationship between structure and use. The forms which express their use simply and directly have taken on associated values. The hearthstone is the symbol of the ages for home and domestic comfort, from the distaff Fate spins the thread of life, the shepherd's crook has become the bishop's crosier, while the shepherd's homely duties have served as the outward and visible sign of divinity. The figurative language of art and religion testify that typical forms and activities appeal to the imagination. We are not always successful in achieving this distinction for ourselves, but we unconsciously respond to it. The appeal of the dress makes the young girl want to be a nurse. Uniform and trappings recruit the army and the navy.

The beauty of the Greek and the Gothic is the perfectly proportioned and organized living structure. Columns, architrave, frieze, cornice, buttress, vaultings, all are performing necessary work. It gives a thrill of satisfaction when the architect takes us into his confidence and reveals the scheme of things. The climax of pleasure comes when we realize that out of the very necessities and limitations of construction and material he has realized a harmonious decorative ideal. Just as certain forms possess style, so do materials when they are used in proper place and with appropriate technic. There is an ideal workmanship for material. Pottery is built up and shaped with the hands and so we like to see the im-

print of the thumb and the irregularity which suggest the plasticity of clay and its ready response to the creative impulse. The marks of the tool on wood or the suggestion of the mallet on beaten metal recall to us a complete process, enriching the tangible result by the added human values of time and labor. Tradition has something to do with our expecting to find materials in certain form, as in the case of precious stones; when glass is cut and mounted like the diamond it compels a comparison with the accepted material. As a result we call it cheap; in any of its own legitimate fields its standing is unquestioned. The well-woven cotton fabric never loses caste because it is not silk or linen. It fills its own place, whereas the "near-silk" is always a beggar among princes. A well-constructed brick building has only to stand the test of comparison with its own kind, but when it puts on a finish of corrugated metal and is made to look like stone it has forced itself into the class of stone buildings, where it fails to "make good."

These and innumerable examples which might be cited serve to show that the mind seeks naturally to relate form and idea and that standards of beauty in fine and industrial art have as a psychological basis this fundamental demand for harmony. This is a fact which the modern workman can not afford to ignore. When he is designing a form which is only an improvement on something that has a wealth of tradition behind it, the new design, no matter how practical, will never appeal to the imagination. For instance, the steam radiator will not in that sense be a substitute for the open hearth, and so the sensible architect treats it as a subordinate matter in his scheme, while he might make the fireplace the focus of the room. The pictures of the Panama Canal painted by Jonas Lie, impress one with the fact that in the field of new endeavor, in the legitimate product of this modern race of Titans, the imagination will find machine material as significant, as expressive, as has been the simpler product of the hand.

To my mind the foregoing are the most important principles for us to teach in the school. They furnish what Miss Addams seeks, the clue as to what to select and what to eliminate when the youth comes into contact with contemporary social and industrial conditions. How is this to be done? It seems to me that our design work should be organized with more definite reference to training the judgment in the kind of concrete problems that will come up in the life at home and at work. Unfortunately in the school we are in constant danger of mistaking the picture of the design for the whole thing. The drawing of a border in light and dark color is only a method of experimenting or *thinking* the pattern before it is put into material. It is a very necessary part of the process, but it should be a part only. The most fundamental element of design is structure itself. In an architectural monument the structural features include the arrangement of space in the ground plan, the proportions and shape of the elevation, the nature of the supporting framework. The structural elements of a vase are all its essential surfaces. The bounding edge of a rug is the result of the structural relationship of warp and woof. Every problem in applied design includes the consideration of structure, which must in itself be ornamental in order to achieve beauty.

The only way in which we can teach these principles is by having the children design and construct in typical material. This directs the attention and prepares the way for a more extended study of industrial products. The household art is doing a great deal for the girls. The weak point in that work is too much dictation, so that the design side is left out and the teacher gets the training instead of the students. Less has been planned for the boy and this is most unfortunate, as there is a tendency to draw a sex line between manual skill and aesthetic appreciation. The boy is going to remain longer in industry than the girl and he will in the future erect signboards, put up nickel theaters, plan our public utilities, and dictate about all those matters which make or mar the beauty of our community life. We haven't reached him yet. At about the seventh grade he is immensely interested in civics and I believe that we should give a course leading toward appreciation of civic art which would be of benefit and interest to both boy and girl. This course would consist of a little drawing, a great deal of looking and selecting.

Here and there cities are doing work along this line. (Indianapolis recently made an interesting report of selecting sites and planning stores and dwelling houses, making estimates of cost of material and furnishings.) Such teaching should be adapted to the particular needs of the community. Above all, the industries should be taught as arts. They should not be devitalized by methods which reduce them to the level of mere manual dexterity.

In closing I would like to call attention to the fact that I am not talking about art *and* life but art *in* life. I hope to leave with you this thought that art touches daily life in so far as it develops an attitude of mind which shows, not in the way we do *some* things but in the way we do *every* thing.

THAT thing which I understand by real art is the expression by man of his pleasure in labor. I do not believe he can be happy in his labor without expressing that happiness; and especially is this so when he is at work at anything in which he specially excels.

William Morris.

GARDEN FURNITURE OF CONCRETE

E. R. Bridge, Director of Manual Training, Galesburg, Ill.

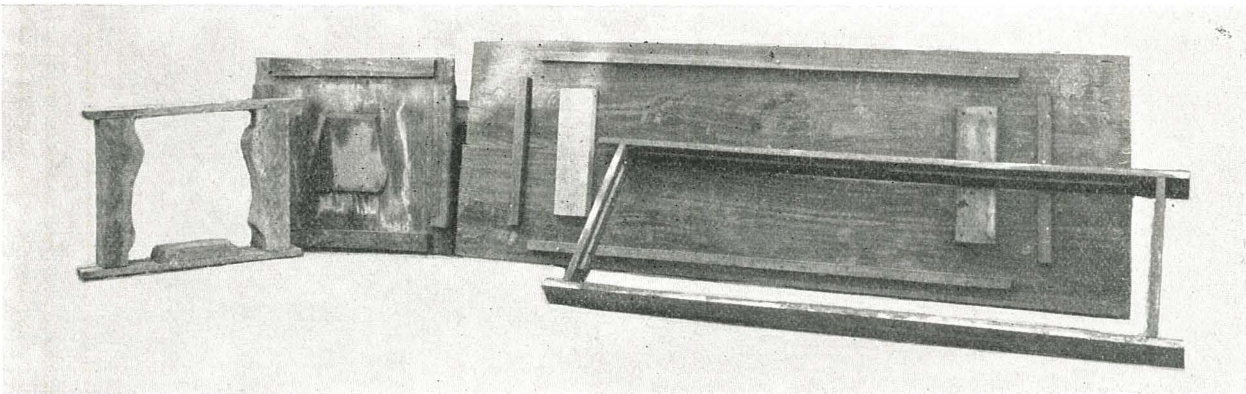
AN interesting problem in concrete construction is the making of a garden seat. A slab of concrete placed over two pedestals and held in place by a simple mortise joint will make a very simple but artistic concrete problem, which will be an ornament to any well kept lawn. If desired the mortise joint may be left out as the weight of concrete slab is sufficient to hold it permanently in place.

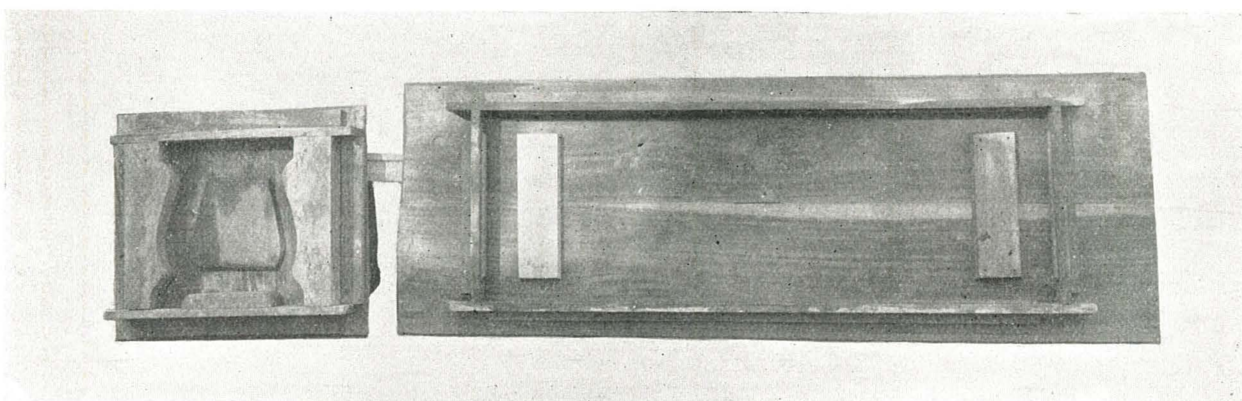
But two very simple forms are necessary for the construction of this bench, and the problem may be presented in the upper grammar grades or in high school courses and gives considerable latitude for individual design.

The seat or slab is 3″x18″x54″, being either a plain slab or decorated edges. The form for the base of the seat is made over size 22″x60″ of 1 inch material and the cores into which the pedestals will fit are securely fastened by clinched nails in the proper place, allowing the ends to set over the pedestal 3 inches and sides 2½ inches. This will give the core dimensions 1″x4½″x13½″, tapering the same to 1″x4″x13″ to allow for removal from the form.

The frame to confine the concrete should have inside dimensions of 3″x18″x54″. Cut the ends exact measurement and allow sides to over run. One panel ⅜″x1¼″x14″ is set in each end, and two ⅜″x1¼″x24″ in each side, allowing 2 inch space between panels. These negative panels must be securely fastened to the frame and slightly tapered so they will not stick in the green concrete. The frame is fastened together with screws after careful sanding, and then placed on the base form. It is held in place on this form by strips half nailed in proper position.

The concrete mixture for the slab is 1 Portland Cement, 2 Clean Sand, 3 Crushed Rock of small size (½ to ¾ inch). The composition may be varied to meet individual desires, such as the use of crushed marble, or coloring material.



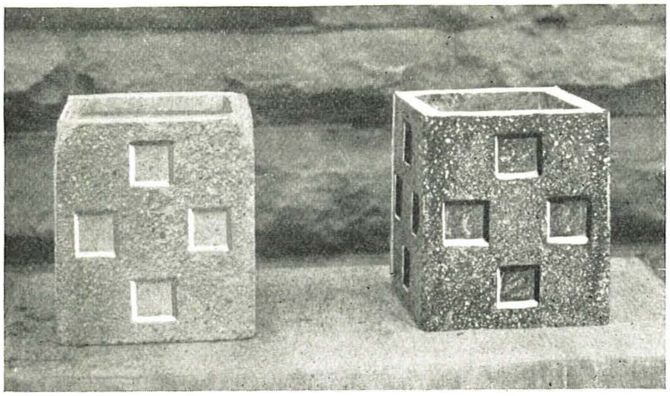


FORMS USED IN MAKING CONCRETE GARDEN SEAT.
Made by Students of the Galesburg High School.

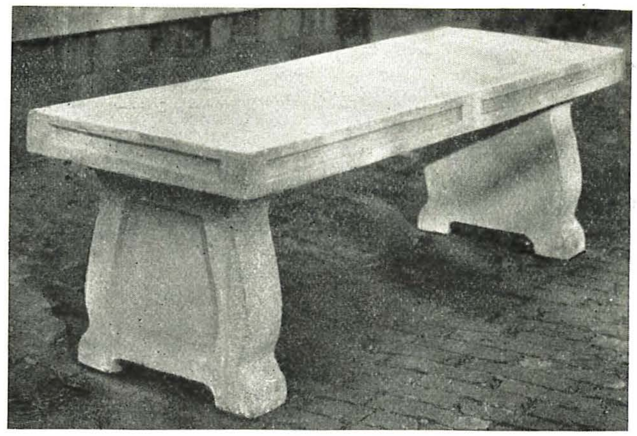
It might be desirable here to give a few of the coloring materials used with satisfactory results. For

Black	2 per cent Excelsior Carbon Black.
Gray	½ per cent Excelsior Carbon Black.
Brown	6 per cent Roasted Iron Oxide.
Buff	6 to 10 per cent Raw Iron Oxide.
Bright Red	6 per cent Pompeiian Red.
Blue	5 per cent Ultramarine.

All material used for coloring must be free from sulphur and should not exceed 10 per cent of mixture. Sand, cement and coloring material, if used, are mixed dry and until the whole mass is of uniform color. The



Concrete Jardinieres. Interesting Mottled Effect Produced with Marble Chips.



Garden Seat of Concrete.

coarser aggregates are then added and turned over several times. The water should be added with a sprinkler and the whole mass turned until the coarse aggregates are uniformly contained in the mortar.

This mixture is placed at once into the form being careful to keep the larger aggregates from the sides. This is done by spading. When one inch of concrete is placed evenly in the form, it should be well tamped with a square bottom tamp, especially close to the sides. A round bottom tamp will not release the air spaces next to the form, and this is certain to produce unsatisfactory results. It is well to vibrate the form at intervals during the placement of the concrete.

Reinforcement of ½ inch Clinton wire cloth, is placed after one inch of mortar is in the form. It is well to use as large a piece of reinforcing as possible without touching the sides of form. The form is then filled and tamped well, remembering the top of this cast is the top of the seat, and is to be finished smooth.

The frame may be removed the second day and any retouching or pointing up necessary, done. The slab should be allowed to remain on the base for ten days, springling daily.

The pedestal forms are also made in two parts. A base 22"x22" made of 1 inch material and frame to confine the cast. In the accompanying cut the maximum width is 15 inches, heigth 17 inches, thickness 4 inches. If panel is used on the outside of pedestals, the form for this is securely fastened to base. The sides of frame are cut from 4 by 4 or built up stock; top and bottom boards of 1 by 4 with core screwed to bottom board. This will form small legs and hold the bench in level position. In assembling this form care should be used to make certain that the top of the pedestal will fit exactly the core hole in the under side of seat. The whole frame is then placed in position on the base and fastened with cleats on four sides.

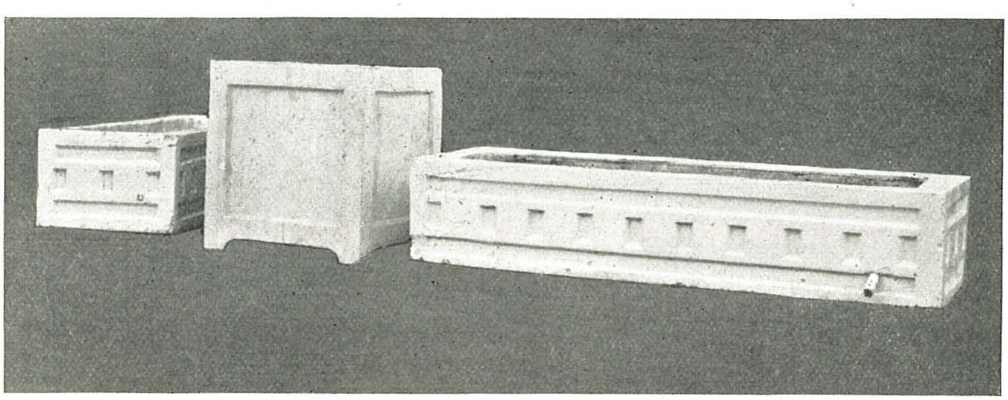
Use the same mixture as in casting slab with same precautions in loading forms and removing the same. No reinforcement is necessary for the pedestal.

Concrete Flower Pots and Porch Boxes.

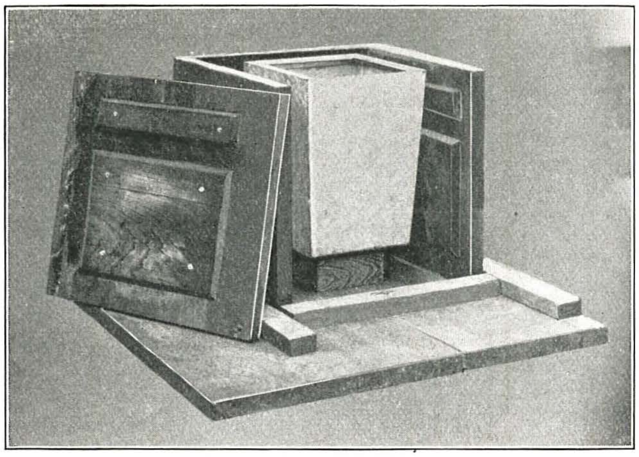
In the construction of flower pots and porch boxes, we must study the making of cores. There are several ways by which satisfactory results may be obtained. In some cases a solid core, carefully constructed, well sanded, shellaced and oiled may be used, and is permanent, but for general purposes it is too bulky.

A cardboard core filled with sand may be used where the concrete problem is made with a very dry mixture, and where the inside of the cast does not need to be exact in its lines. This is a very simple core to remove, but is not permanent, requiring a separate core for each cast.

A very satisfactory collapsible core for general purposes is given by Davison in his book on "Concrete Pottery and Garden Furniture." In the sides of this wooden core is cut a "V" shaped piece and is fastened in place by screws. When core is to be removed the "V" shaped piece is removed and sides may be pulled out easily.



PORCH BOXES IN CONCRETE.



Form for Making Concrete Jardiniere. The Cardboard Core is in Place.

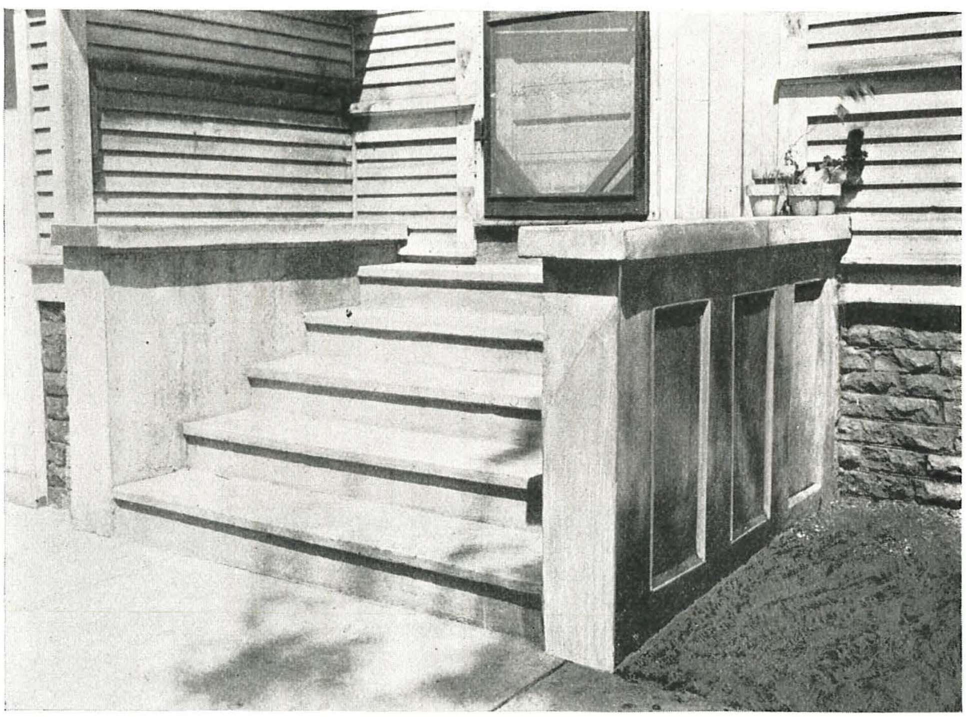
The most satisfactory and permanent core used in our high school is made of galvanized iron, with handle attached, and filled with sand. When thoroly oiled, the core is easily removed and can be used as long as the form remains intact.

The dimensions of flower pots shown in the illustration are 9″ by 9″ by 10″, with core 6½″ by 6½″ at top tapering to 5½″ by 5½″ at lower end, 8½″ in depth. Any decoration desired can be placed on the inside surface of the form, by use of moulding panels, tiles, etc.

The mixture contains 1 Portland cement, 1½ clean sand, 2 small sized crushed rock, washed gravel, or marble chips. Just enough water is used to make the mixture of the consistency of damp earth. With this dry mixture the concrete will set up rapidly, and can be removed within two hours. This, however, is an operation requiring considerable care, and a little experience. One and one-half inches of grout is placed in the form, well tamped before the core is placed. A small amount is placed at one time, tamping thoroly, until the form is nearly filled. Near the top we place reinforcement of No. 9 wire, making a square loop and allowing ends to overlap 30 diameters. The mixture placed on this reinforcement must be wetter than that used to form a bond between it and the wire.

This cast is allowed to stand from two to four hours, then the core is carefully removed. The following day the outside form is taken off, and the cast is covered and allowed to cure for ten days.

This problem offers an unlimited opportunity for individual design.



Concrete Steps Built by Boys of the "Concrete Construction" Class, Galesburg High School.

INDUSTRIAL ARTS DESIGN

HORIZONTAL SUBDIVISIONS OF THE PRIMARY MASS

William H. Varnum, University of Wisconsin

(Second Article)

IN the first article we discussed the nature of the primary mass in its relation to the intended service or duty it has to perform. It was found that the demands of service usually cause the primary mass to be designed with either a strong vertical or horizontal tendency.

It now becomes imperative to carry the designing processes still further and divide the vertical or horizontal primary mass into parts or subdivisions, demanded either by structural requirements or because the appearance of the object would be materially improved by their presence. This latter point is sometimes referred to as the aesthetic requirement of the problem. There are two simple types of divisions, those crossing the primary mass horizontally and those crossing the primary mass in a vertical direction. This article will be limited to the subject of horizontal divisions.

Nature and Need of Horizontal Space Divisions.

If a city purchases a piece of land for park purposes, presumably a landscape architect is assigned the task of laying out the paths and drives. He does this by crossing his plan at intervals with lines to represent paths connecting important points. Under favorable conditions the architect is free to curve his paths to suit his ideas. He has considerable freedom in selecting his design but the paths or roads must dip and curve in sympathy with the contour of the land and in accord with the aesthetic requirements.

While the landscape designer has a broad latitude in his treatment of land divisions, the industrial designer or architect on the other hand is restricted to the structural requirements of the object and by his materials. He must cross his spaces or areas by horizontal shelves, or rails, or bonds of metal that hold the structure together. As architecture is of fundamental importance in the arts of design, let us see what he has in mind in designing a structure.

The architect has the surface of the ground with which to start. This gives him a horizontal line as the base of his building. He considers it of major importance in his design. We find him crossing the front of his building with horizontal mouldings or long bands of colored brick paralleling the base line and interestingly dividing the vertical face of the front and sides. His guide is the bottom line of his primary mass or the line of the ground which binds the different parts of the building into a single unit. It can be readily seen that if he waved his mouldings up and down with the freedom of the landscape architect's roads he would not be planning his horizontal divisions in sympathy with his primary mass.

These horizontal divisions or lines have a tendency to give added apparent length to an object. Thus a designer may make a building or room look longer than it really is by their judicious use.

Let us now turn to the simpler objects with which we may be more directly concerned. The piano bench has horizontal lines crossing it, giving an effect quite similar to that of horizontal mouldings crossing a building. There may also be ornamental inlaid lines crossing the bench and intended to beautify the design, but it is to be remembered that at present we are considering the *structural divisions* only.

Designing Objects with Horizontal Divisions.

Plate 6 represents a concrete example of the methods to be used in designing the horizontal divisions of a piano bench. The steps may be divided as follows:

A. The height of a piano bench may be determined either from measurement of a similar bench or from one of the books on furniture design now on the market. The scale of 1″ or 1½″ to the foot should be adopted, and two horizontal lines should be drawn for the bottom and top of the bench. The distance between these lines is arbitrary and is fixed at 20 inches.

B. It will be found convenient to design many objects within rectangles enclosing the main or overall proportions of the objects. With this in view and keeping in mind the width of the bench necessary to the accommodation of two players and the requirements of a well proportioned primary mass (Rule 1)*, the lines are now drawn completing the rectangular boundaries of the primary mass. The limitations of service and the restrictions of good designing give the width of the primary mass so designed as three feet two inches, with a ratio of height and length of 5:8½. It is simpler to first design the most prominent face of the object to be followed by other views later in the designing process.

C. By observation of similar benches it is seen that the horizontal divisions will take the form of a rail and a shelf, making two crossings of the primary mass dividing it into three horizontal spaces. Several trial arrangements of these structural elements are now designed with the thought of making them conform to the rule governing three horizontal spaces (Rule 2b). We shall later discuss fully this rule and its applications.

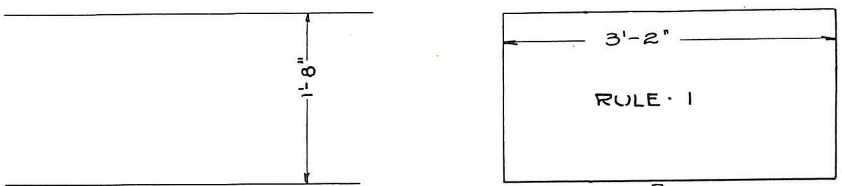
D. By selecting the best sketch the designer has the basis for the application of the structural elements, and the project begins to mature in its concrete form. The top board may project slightly beyond the primary mass without materially affecting the value of the designed proportions.

E. The last step is the designing of the side view in relation to the front surface and to itself. It is strongly urged that the final or shop drawing be of full size. In more elaborate designs the finer proportions are lost in the process of enlargement from a small sketch, often hurriedly executed in the shop. Again much time is lost by necessary enlargement, whereas a full size curved detail may be quickly transferred to wood by carbon paper or by holes pricked in the paper. It is not expensive or difficult to execute full size drawings; it is in accord with shop practice and the custom

*The rules referred to are printed in italics in the first article, January, pages 5-11.

STEPS ILLUSTRATING THE DEVELOPMENT OF HORIZONTAL SPACE DIVISIONS FROM PRIMARY MASS TO THE STRUCTURE

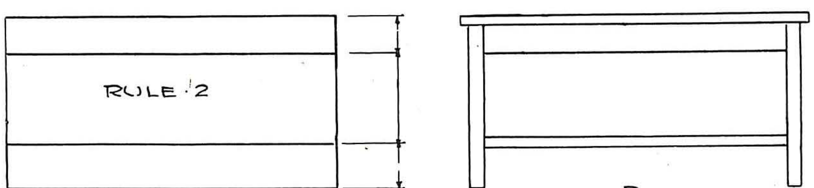
DEMONSTRATION IN CLASS I (WOOD)
PROBLEM: A MUSIC BENCH FOR TWO PLAYERS



A
ESTABLISHING THE DIMENSION REQUIRED BY SERVICE I·E· THE STANDARD HEIGHT

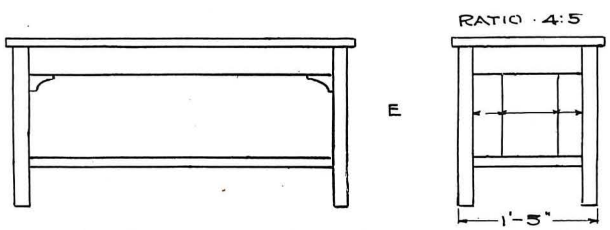
B
ESTABLISHING THE LENGTH OF THE DOMINANT OR FRONT SURFACE· RATIO 5:8½

DESIGNING THE PRIMARY MASS



C
ESTABLISHING THE HORIZONTAL SPACINGS OF THE STRUCTURE· SEVERAL TRIAL DESIGNS SHOULD BE DRAWN·

D
ESTABLISHING THE CONSTRUCTIVE ELEMENTS BASED UPON THE BEST OF THE PRECEDING DESIGNS·



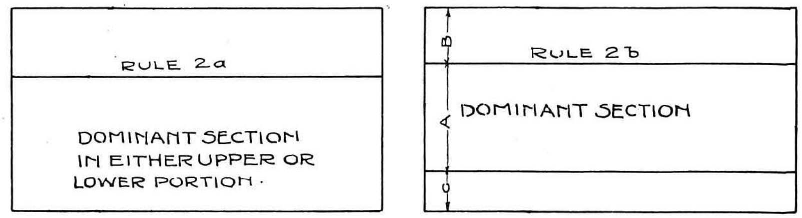
E

THE COMPLETED WORKING DRAWING · TO BE FULLY DIMENSIONED AND IF PRACTICABLE. DRAWN FULL SIZE ON DUPLEX OR MANILA PAPER·

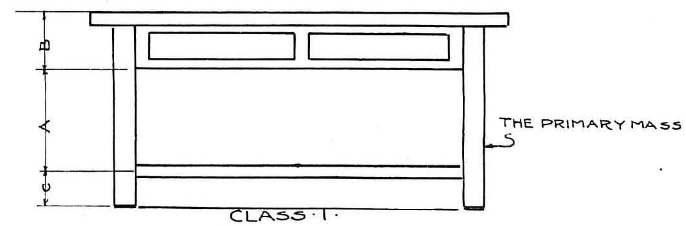
Plate 6.

·APPLIED AND CONSTRUCTIVE DESIGN

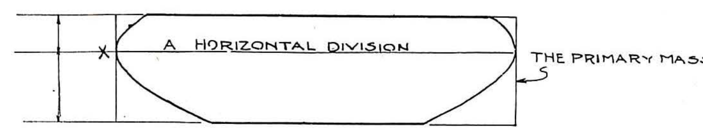
PRINCIPLE I: A· PROPORTIONS OF THE SINGLE PRIMARY MASS WITH DOMINANCE OF THE HORIZONTAL DIVISION·
PRINCIPLE 2: A· RELATION OF HORIZONTAL SUB-DIVISIONS·
PROBLEM: HORIZONTAL SPACE DIVISIONS· CLASSES I· 2· 3·



TWO HORIZONTAL DIVISIONS — THREE HORIZONTAL DIVISIONS
PRIMARY MASSES 2:3 · 3:5 · 5:8 ETC



CLASS·I·
WOOD
THREE HORIZONTAL DIVISIONS



CLASS 2· CLAY: CLASS 3· METAL
TWO HORIZONTAL DIVISIONS

DRAW THREE DESIGNS IN A SELECTED CLASS· DESIGNS OF RECTILINEAR SOLIDS SHOULD INCLUDE FRONT AND SIDE VIEWS· COMPASS CURVES ARE TO BE AVOIDED IN PROFILES OF CURVILINEAR FORMS IN CLASSES 2·3
DESIGNS SHOULD HAVE A DOMINANCE OF THE HORIZONTAL PROPORTION

Plate 7.

should be encouraged and followed on all possible occasions.

The process of designing round objects is identical to the preceding as illustrated by the low round bowl in Plate 7. It should be designed in a rectangle of accepted proportions (Rule 1.) Rules 1 and 2 are given in italics mum width. If this widest point in the primary mass (X-Plate 7) is pleasingly located between the top and bottom of a vase form the contour will be found satisfactory.

It is possible to continue ad infinitum with these illustrations but horizontal space divisions are nearly

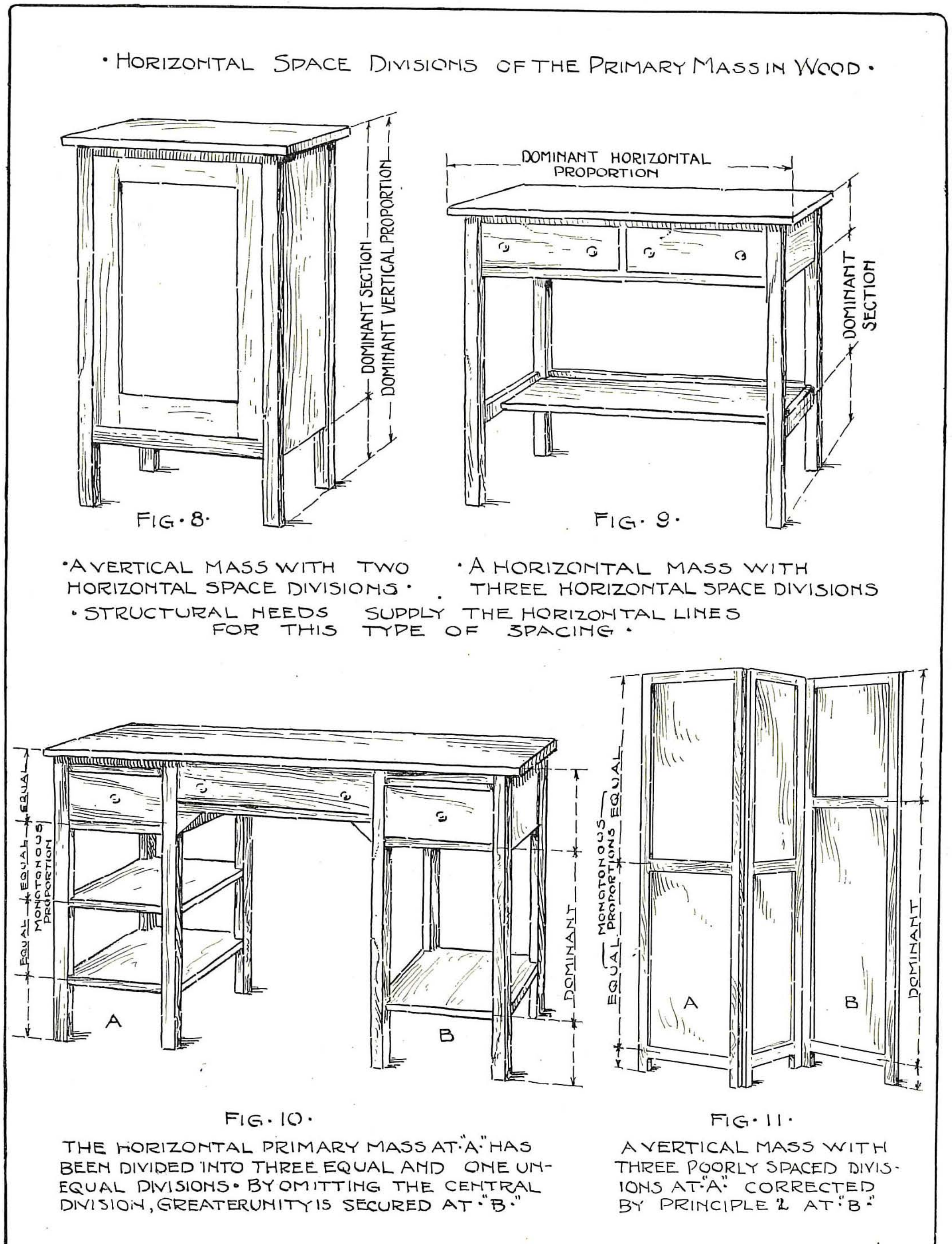


Plate 8.

in the first article. The primary mass may have excellent proportions and yet the vase or bowl may remain devoid of interest. It is commonplace.

As will shortly be shown, the rules governing horizontal divisions serve as a check on the commonplace. A horizontal division generally marks the point where the outward swell of the vase contour reaches its maximum always present in some form due to structural necessity or aesthetic requirements. It is an easy matter to say that these lines must divide the primary mass into "interesting" spaces, well related to each other or "pleasingly located" but the designer must have some definite but flexible rule to govern his work. From the analysis of many famous historic buildings and well designed in-

dustrial projects it has been found that all horizontal masses may be analyzed as dividing the primary mass into either *two* or *three* divisions or spaces, regardless of the complexity of the project.

we have already discovered in the first article is not conducive to good design.

By the stated rule, 2a, the varied adjustment of this double horizontal division affords all possible latitude

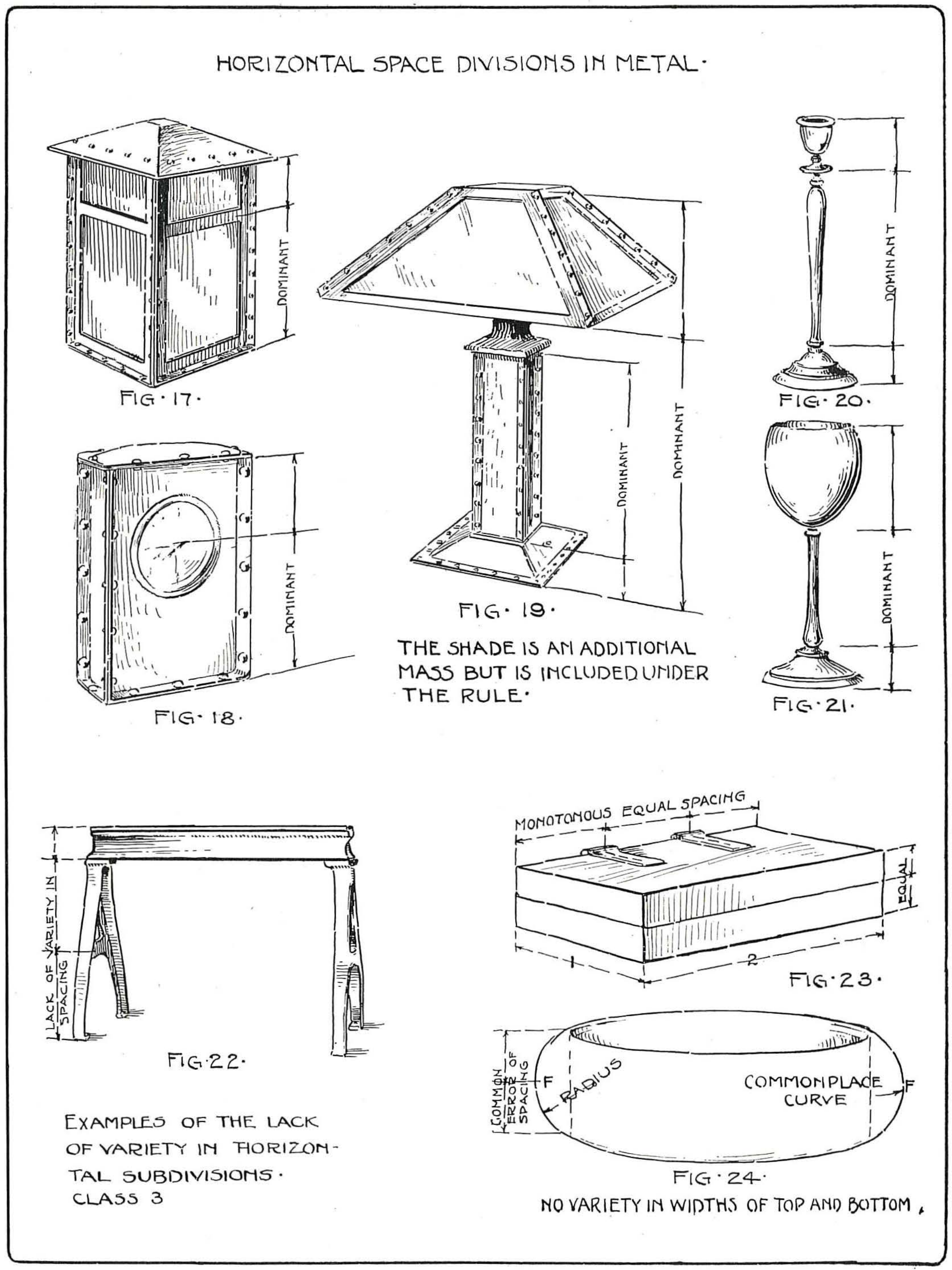


Plate 9.

Analysis of Horizontal Space Divisions.

Two Horizontal Space Divisions. Rule 2a. If the primary mass is divided into two horizontal divisions, the dominance should be either in the upper or the lower section. Plate 7 shows this division of the primary mass—the simplest division of the space. A space divided just half way from top to bottom would be monotonous and expressive of the ratio of 1:1. This arrangement as for constructive purposes. It is better to place the division in such a manner that the upper division (or lower) will not appear pinched or dwarfed by comparison with the remaining area. Thus 1:3 or 3:5 or 5:8 are better ratios than 1:1 or 1:18, but there is no exact or arbitrary ruling on this point.

Two Horizontal Divisions in Wood. Figure 8 illustrates two horizontal divisions in wood construction and

also the freedom of choice as to proportions. The eye will be found a good judge of the proper spacings subject to the limitations already mentioned.

Two Horizontal Space Divisions in Clay and Cement. It is best to keep the design within the limits of two primary mass. Figure 13 has been used to illustrate the fact that horizontal space division principles are applicable to any material. The horizontal divisions in Figure 13 are due to structural needs. A horizontal line carries this division across to Figure 14, a clay vase. The

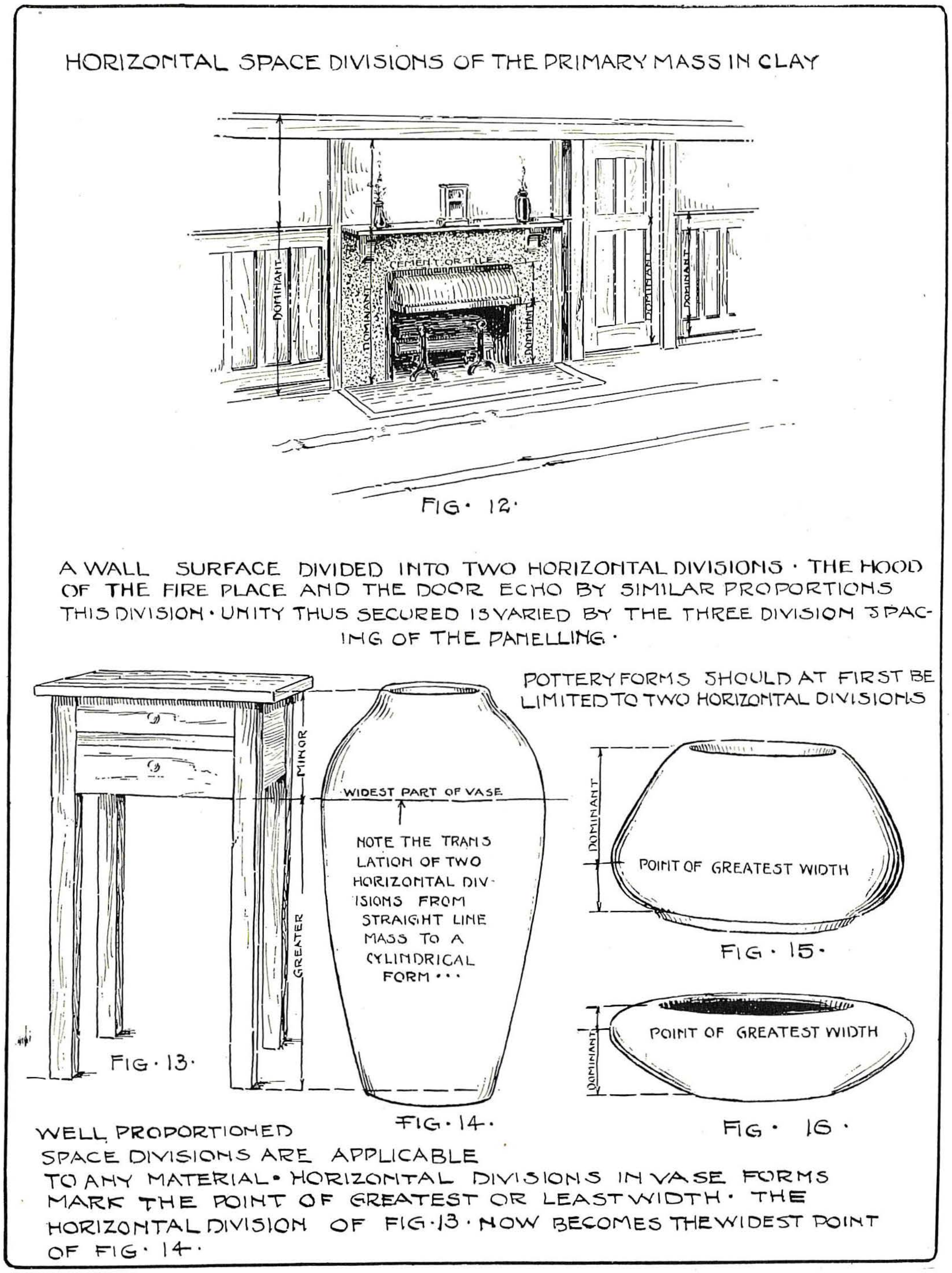


Plate 10.

horizontal space divisions in designing cylindrical clay forms, particularly in the elementary exercises. Enough variety will be found to make pleasing arrangements, and the technical results are much better than those obtained from a greater number of divisions.

Figures 14, 15, 16 are clay forms with the dominance placed in either the upper or lower portion of the horizontal division now becomes the line marking the widest portion of the vase with the same relation to the top and bottom lines as in Figure 13. It marks an aesthetic point in the design of the vase or a variation of the contour introduced by reason of its effect upon the beauty of the vase not called for by the needs of actual service.

A musical composition is often played in an orchestra first by the wood instruments, taken up and repeated by the brasses, then by the strings and finally played as a harmonious whole by the entire orchestra. There is a close parallel in Figure 12, an adaptation of one of Gustav Stickley's designs. The two-division rule is used in the relations of the plaster and wainscoting, again in the plaster over, and the cement or tile around the fireplace; it is repeated in the arrangement of the copper and cement of the fireplace facing and hood and in the door panels. By repeating again and again similar space divisions the wall space becomes a unified and harmonious whole. Variety is secured by the introduction of three horizontal divisions in the details of the wainscoting. This method of repeating similar space divisions is called "echoing" and is one of the most effective means known for securing the effect of Unity.

Two Horizontal Divisions in Metal. The horizontal subdivisions in metal are usually made for service. Figures 17, 18 and 19 are examples of such divisions. The location of the clock face in Figure 18 calls for the placing of its horizontal axis in accordance with Rule 2a. The lamp in Figure 19 shows an instance where the entire design once divided by Rule 2a, may be again subdivided into a similar series of divisions. This arrangement is quite similar to the system of repetitions seen in Figure 12 and termed "echoing" the original divisions.

Three Horizontal Space Divisions. Rule 2b. If the primary mass is divided into three horizontal divisions or sections, the dominance should be placed in the center section with varying widths in the upper and lower thirds.

When it becomes necessary to divide the primary mass into more than two sections the designer's problem becomes more difficult. With the addition of a greater number of horizontal divisions there is a manifest tendency for the design to become cut up into so many small sections that the simplicity of the whole mass is lost. Here, as elsewhere, that principle which we call unity or the quality of "holding together" is necessary and should be the constant test of the design. The instant any part of the design seems to fly apart from the main mass it becomes the designer's duty to simplify the design or pull the parts together and thus restore the lost unity.

As a restriction against loss of unity it is necessary to group all of the minor horizontal divisions into a system of two or three large horizontal divisions. Referring to Rule 2b, it is seen that when three divisions are used, it becomes the practice to accentuate the center section and make it larger. This arrangement is designed to give weight to the center portion and by this big stable division to hold the other subdivisions together and in unity.

Three Horizontal Divisions in Wood. Two horizontal masses and one vertical mass shown in Figures 9, 10, and 11 illustrate the application of this three division rule to wood construction. It is seen that the constructive factors of rails, doors and shelves are responsible for the fixing of all of these divisions. It may also be seen that three divisions are applicable to either the vertical or the horizontal primary mass. Figure 10 illustrates the violation of this type of spacing at the point A, where the shelves are no more pleasingly arranged than the pickets of a fence. Later on we shall be able to rearrange these shelves in a pleasing manner but at present it is better to relieve the monotony by omitting the center shelf. This applies the three division rule to the satisfactory appearance of the desk at B.

Similar monotony in spacing is seen in the screen, Figure 11. The correction at B appeals at once as a far more satisfactory arrangement than the spacing of the cross bar at A. There are no practical infallible rules applicable to this readjustment beyond those already stated. The eye must in part be depended upon to guide the artistic sense aright.

Three Horizontal Divisions in Clay. It is suggested that it is desirable to keep clay forms within the limitations of two divisions. Rectangular posts, pedestals and other vertical forms in cement may be developed by the application of Rule 2a or 2b, taking care to group all minor divisions well within the limitations of these rules.

Three Horizontal Divisions in Metal. The statement just made in reference to simplified groupings is illustrated in the candle-stick and cup in Figures 20 and 21. The construction based upon the three functions performed by the (1) cup, (2) the handle, and (3) the base, has suggested the use of these horizontal divisions. The minor curves have been subordinated to, and kept within, these three divisions. The final result has a distinct feeling of unity impossible under a more complex grouping. The Greek column will afford an architectural illustration of a similar grouping system.

The lathe bed of Figure 22 shows one of innumerable examples of space violations in the industrial arts. The slight dropping of the cross brace would add materially to the appearance and strength of the casting. Figure 23 is a copper box with the following more or less common faults of design: commonplace ratio of length and width (2:1) partially counteracted however by a more pleasing ratio of the vertical dimension, equal spacing in the width of cover of box and box body, equal spacing of the hinges of the box from the ends of the box and from each other. By applying the two and three horizontal division rules these errors may be avoided.

Figure 24 shows a low bowl with a compass curve used in designing the contour. This has brought the widest part of the design in the exact center of the bowl which makes it commonplace. In addition to this the top and bottom are of the same width, lacking variety in this respect. Correction is readily made by applying a freehand curve to the contour, raising or lowering the widest point (F), at the same time designing the bottom either larger or smaller than the top.

Instruction Sheet for Class Presentation. Plate 7 is a sheet suggestive of the presentation of Rules 1-2a-2b to classes, with an indication of the type of problem to be required. The steps of the designing processes in either wood, (class 1), clay, (class 2), or metal, (class 3), are summarized as follows:

1. Construction of the rectangle representing the

vertical or horizontal character of the primary mass with desirable proportions. It is better to select a typical view, (Plate 6, D), preferably a front elevation.

2. Subdivide this rectangle into two or three structural sections; horizontal in character. Make two or three trial freehand sketches for varied proportions and select the most pleasing in accordance with Rules 1, 2a and 2b.

3. Translate the selected sketch to a full size mechanical drawing or at least to a reasonable large scale drawing, the structural elements: i. e., legs, rails, posts, should be added and other additional views.

4. Dimension and prepare for shop purposes.

5. Construct the project.

The next article of this series will consider the rules governing vertical space divisions.

Can a Trade Be Effectively Taught in an Industrial or Trade School Without the Aid of Commercial Work?

Richard M. Van Gaasbeek, Dept. Carpentry and Building, Pratt Institute

THE term commercial work as hereafter used refers to any actual usable project that may be manufactured, whether to be sold in the open market, made on contract or further equipment for the school.

It is the opinion of the writer that a trade cannot effectively be taught in a school unless the school is properly equipped to be able to, and does, turn out a commercial product.

A trade cannot be taught on purely abstract exercises and I cannot see any reason why commercial manufacturing should interfere with the proper teaching of a trade and the development of the apprentice.

Trade experience comes from having a variety of projects to make. To increase a boy's promotional capacity, he must understand how to make a shop layout. This cannot be taught intelligently by the exercise method. The boy cannot master a shop layout unless he can work the various processes and assemble them. By comparing the assembled parts with the layout he begins to grasp the value and necessity for such a layout.

Commercial work can be effective only, if at the time a boy is given instruction; and being shown how to do a certain process, the attention of the entire class is called to that process. Commercial work then becomes educational, while on the other hand if the boy working on a process is the only one given instruction on that process then the school is turning out a manufacturing product and not teaching a trade.

Confining myself to the woodworking industry with which I am most familiar, there appears no reason why a boy should require any intermediate step between the school and the shop, but that shop conditions should be created in the school. Speed is a factor not to be considered at any time in the training of a boy, but by the elimination of false moves—the study of scientific management—speed is unconsciously maintained, and the labor of the boy is diminished, yet the output is increased.

A school should not at any time accept work on a contract with a time limit. The natural tendency is to be intent on making a specific object rather than training the boy.

The industry does not give a man the opportunity to make a study of new processes. He is hired because he says he knows and is not expected to consume any of his employer's time in investigation. Its followers are not ready to accept a compensation that would warrant the employer taking his time to teach and help his employees. And so the school offers that opportunity to investigate and study various processes that the average mechanic does not know and has very little chance of learning. It is not necessary for the school to give the training that a fellow can get on the job but it should confine itself to the principles in practice, related work, mathematics, drawing and science which the industry does not give.

What then is the most essential thing a boy should know in his trade? Is it the use, care and handling of tools? After an instructor has given the class a demonstration on the names of the various tools, how to sharpen, how and when to use them, is it not necessary after such instruction for the student to acquire a certain amount of experience to become proficient and cannot this experience be given in the development of a commercial product where the constant repetition brings all the various tools into practice and the instructor is given an opportunity to follow up his class demonstration by individual instruction as a boy may need his help while actually working on the job? The attention of the class should not be occupied repeatedly on this question but more attention paid to the development of constructive ability, the most essential qualification necessary.

If a boy or man can keep his tools in perfect order and can handle them to perfection in the execution of his work, can we say he has a trade? It might be called specialization and be termed a branch of the trade. Examine the average mechanic of today and what do we find? He has no trouble in using his tools. He can face off material, frame up work after it has been milled, etc. Give him a detail drawing or a rough sketch of a cabinet that is required and ask him to get out the stock. This would test his knowledge of the trade. As it is, he is the last to be taken on a job and the first to be let go.

Is it to "speed up" the boy so that he can fit and hang as many doors a day as his mate, fit and hang sash, lay floors, put up trim, base, etc., as fast or quicker than his partner? No. It is the duty of the school to show the student the principles involved, the construction and how to assemble. It is the business of the student to

apply this instruction and create his speed by repetition after he has left the school and entered a commercial shop.

Is it constructive ability, the ability to plan and see thru his job? Yes. By inculcating in the minds of the students certain principles, constructive ability can be developed. How can this best be accomplished? I received my experience by working as an assistant and from constant assembling of the various pieces of woodwork and a comparison of the construction of the different parts assembled with the working drawing from which the necessary information was obtained to lay out that special piece of work. This plan is not possible in school work. The school does not have sufficient problems and does not hold the boy long enough to have time to teach him a trade with this method, but must begin at the top and teach the principles involved in laying out the work and working from a detail drawing. The boy must, from the very beginning, be taught to lay out his own work and construct his project from that layout. This is the advantage of commercial work, in that it gives the boy an opportunity to come in contact with numerous types of construction and gradually gives him the self-confidence necessary when he is compelled to face the commercial world.

Some branches of the trade can be effectively taught on a scale basis. Stair building, hand rail, roof framing, etc., can be satisfactorily taught by this method, but to close the gap between the school and the shop, commercial work must have a place.

Recently two instructors told me that if they had their way they would remove all the machinery from the schools and compel a boy to cut his material from the rough plank and work the entire project by hand. I asked them why not send the boy out into the woods and cut down the tree and start him at the beginning. This undoubtedly would be nice from an instructor's point of view but not for the boy. A small job would keep the boy in work indefinitely and the instructor would have little to do. A trade school must from time to time add new equipment, replace old equipment for more up-to-date machinery, etc. Instructors must familiarize themselves with trade conditions and new inventions as they are introduced and put into practice on the outside, and in that way keep up with the times and demands of the market. Else, the school will fail in its object and the purpose for which it was organized.

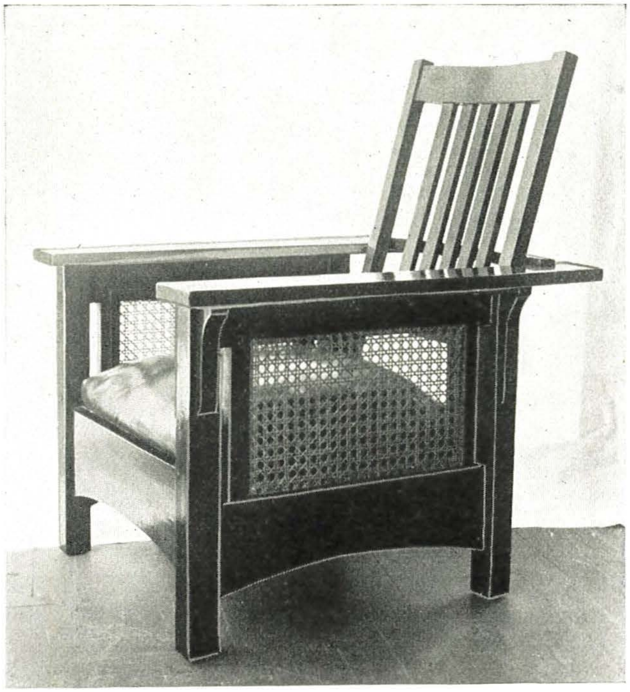
Suppose a boy did cut all his material from a rough plank, how long would it take him to complete that given project? True, he might be more proficient in the handling of tools, but can that be called a trade? There are certain principles involved in constructing a project which appear in different forms in different projects, and experience can only come from having a variety of projects. Why then discourage a boy at the very beginning by giving him unnecessary hard work, labor he will not be called upon to do in the shop? Why not breach the gap between the school and the shop and let the boy utilize the power as much as he can? Why not let him construct as many projects and cover as much ground as possible so that at the expiration of his course he can enter a commercial shop and demand the wages that rightly are his? Shop conditions must prevail within the school.

The burden of an instructor in a school doing commercial work is greatly increased, but for the interest of the boy let us have it.

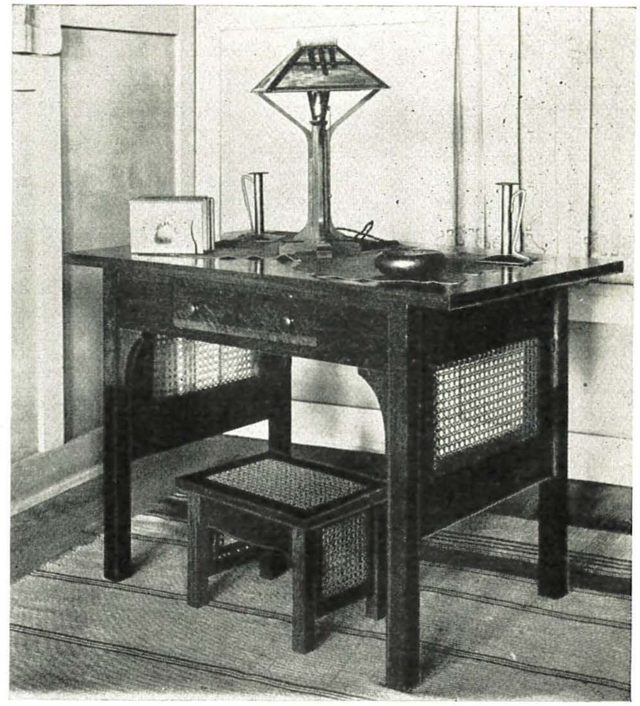
The boy may not realize the value and the experience that he is getting and in some cases does object. Because he is in a school he thinks that he ought to be doing school problems. Then again, if the school is being paid for its products, the boy thinks that the school may get rich from the fruits of his labor.

I believe in a school's taking work on contract without a time limit, at the market value, and favor working out a competitive system, whereby the boy receives a certain percentage of the net profits according to the amount of work he has produced. This would eventually solve the problem of the boy's loafing on the job. It would create competition and increase efficiency.

WE cannot hope to reform the arts from the outside. Reform in art, as in life, must come from within. To improve our material surroundings it is necessary first to reform our motives and desires. The work of our hands must ever be the result and expression of our essential character. *Charles H. Moore.*



Morris Chair With Caned Sides.



[Caned Library Table and Foot Stool.

CANE WEAVING

L. Day Perry, Supervisor of Manual Training, Joliet, Ill.

CANE weaving as a subject in Manual Training shops has, without doubt, many points to justify it if, in fact, it needs justification at all. That it is not generally done in the school shops may be attributed to the fact that instructors are unfamiliar with the process of weaving. It is difficult to acquire a knowledge of cane weaving from printed directions, for it is hard to determine by one's self, for instance, just where to begin a cane, and when a particular procedure is correct. A close study of the work as it progresses step by step, and an application to details, will invariably answer any questions which may arise other than those explained in the directions. After one has caned one or two areas he should have no further difficulty even in caning odd shaped frames.

This work seldom fails to add life to a pupil's work where he has chosen cane in conjunction with his woodwork, and to arouse interest in his problem. The interest aroused is, of course, vital to success in his shop work. Under proper guidance and correlation with wood, it promotes an appreciation of constructive design in which the element of beauty is a prime consideration. It is a practical medium in which the aspect of design as an element of utility is another vital consideration. It has a distinct commercial value, for many old chairs in any community need reseating which a pupil may do for a nominal charge for material and labor. Further, he may do such work after leaving school, as many of our pupils have done, thus earning a little money; and more fundamental, the boy sees where his shop experiences have helped him in a concrete way, and that it had a function after all.

Cane is the name applied to many plants that are possessed of long, slender, reed-like stems. Properly it should apply only to a class of palms known as rattans. The plants are found thruout the Indian Archipelago, Malay Peninsula, China, India, and Ceylon. They are described as growing in dense forests into which sunlight rarely penetrates, forming spiny bushes, making passage difficult or impossible. They grow to the tops of the trees frequently, fall over and train on the ground; in fact, they are trailing in tendency. The stem is covered with green foliage, grows to a length of from one hundred to three hundred feet, and is rarely over one inch in diameter. For export the stems are cut into lengths of from ten to twenty feet. The outer bark is stripped off into widths varying from one-sixteenth of an inch to three-sixteenths of an inch, and put into hanks of one thousand linear feet each, which retail at from seventy cents to one dollar. Cane is named in order from the narrowest to the widest, carriage, superfine, fine fine, fine, medium, common, narrow binder, and No. 1 binder. Cane from India has bark very glossy while that from other places is usually dull in appearance.

Cane for weaving should not be confused with the so-called Cane or Bamboo of the Southern States where it forms the well known Cane Brakes. This cane rarely exceeds twenty feet in height, grows straight and very rapidly, and to a considerable diameter.

Very few tools are needed in cane weaving and but one special one. This is a tool called a caning needle,

a working drawing of which is shown. It is made in the size indicated of round steel wire, flattened at one end, blunt pointed and curved, with an eye. The other end is inserted in an ordinary tool handle. If the wire is run way thru the handle, a washer put on and riveted, the tool will be more serviceable in that the handle will not come off under a pulling strain. The other tools needed will be mentioned as the process of weaving is described.

It is advisable to build a frame for practice in caning. Some advocate reseating an old chair, but the back and arms interfere with the work, and, not least, the seat is usually an odd shape. Make a square frame twelve inches over all. Use three-fourths inch stock, two inches wide. This will leave a hollow square of eight inches. The mortise and tenon, dowel, or end lap are all good joints to use. It is not advisable to use solid stock with the center cut out, for the frame will buckle before the weaving is finished, unless it is well re-enforced. After the frame is glued up and well sanded, gage lines entirely around the inner side of the rails, one-half inch invariably, from the edges. Set a pair of dividers at three-fourths of an inch, and space off this distance, from the intersection of the extended gage lines on each rail. Always space in the same direction on parallel rails. This is fundamental, for it permits of equal division of spaces at the ends of rails if they need redividing, and keeps the cane strands parallel. Next bore three-sixteenths of an inch holes thru the rails at the marked points. Use a twist bit. These dimensions are for either fine or medium cane. Now cut three or four-incn pieces from quarter-inch dowel rods, and sharpen to a long point as you would a pencil. Four or six pegs will be amply sufficient, altho a beginner is inclined to use many more. For convenience in weaving, clamp the frame over the edge of a table with a carriage clamp, and work while sitting.

Steps in Caning.

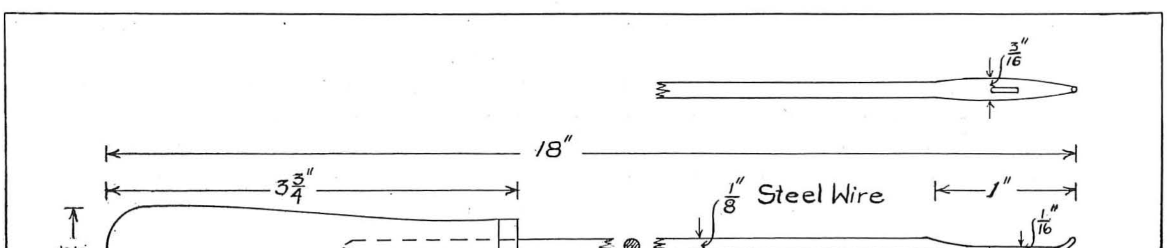
Step 1. Refer to the photograph of the seven steps in caning, and thruout the discussion. Draw a strand of cane thru water. Avoid soaking cane as in reed weaving for it merely needs to be damp to insure tightness when dry. Start work by drawing one end thru any hole, next to a corner one, and let it project about three inches below. Fasten with a peg. Then starting at the peg, pull the entire strand thru the thumb and forefinger to prevent twisting, and pull the end down the hole on the opposite parallel rail and up the hole next to it. Pull reasonably taut and fasten with a peg to prevent its slipping back and becoming loose. Drawing the cane thru the thumb and forefinger again, pull it across the frame and down the hole next to the peg, and up the hole next to it. Pull taut and fasten with the second peg. This operation is repeated until all holes have been utilized on the two parallel rails, excepting corner ones. It is necessary thruout the weaving that the cane be kept from twisting, by the method suggested.

Step 2. The second step in caning is identical to the first only that the other two parallel rails are used, and the canes run *over* the first set of parallel canes. A new strand of cane is not used for each succeeding step or series, but the one is used until the end is reached.

Step 3. The third step is a repetition of the first two. The canes however run *over* the first and second series, and parallel with the first. When one strand is about used up, bind the end by pulling it under a cane, crossing from one hole to another underneath the frame, and cut off. The loose end at the start is bound in this way. It is best to bind loose ends as they come, thus avoiding interference of many pegs and insuring neat binding.

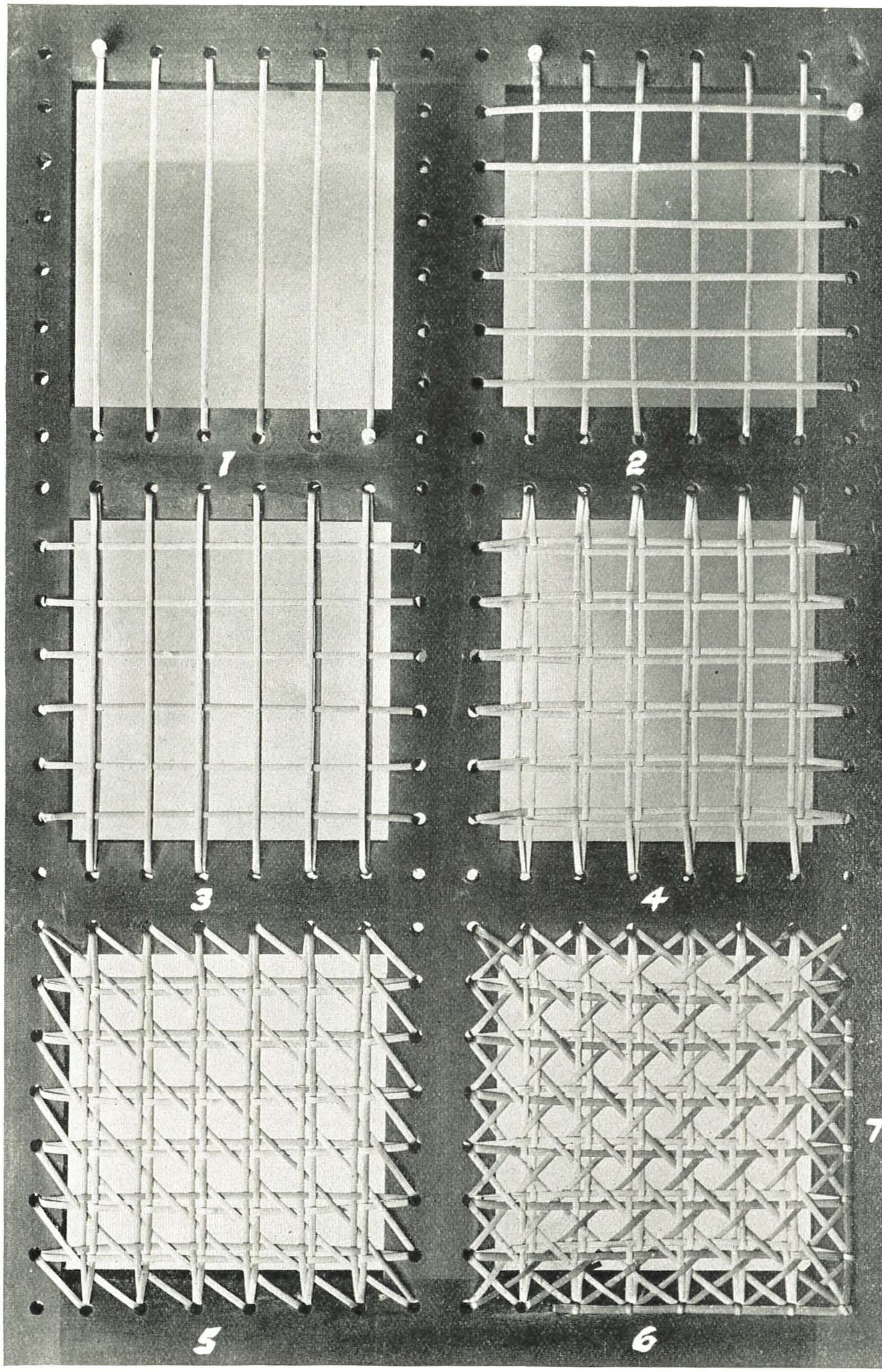
Step 4. We here begin the first actual weaving. It may be done entirely by hand, without resort to the caning needle, but it is slow and tedious work; therefore the needle is recommended. Start at a hole next to a corner, on either rail that has been used but *once,* and on the side of the cane *toward* the open frame. Go over and under the canes necessary to form the weave, turning the needle from one side to another to catch the canes behind the turned point. When across, thread the needle with the end of the strand, and pull thru, being very careful to avoid a twist. If the cane does twist draw it entirely back and start again. Now pull the end thru the hole, pairing the canes. Pull up thru the next hole, starting on the side toward the open frame as at first, and weave thru with the needle again, pulling the cane thru, thus pairing another set. Continue until all canes are paired, when the weaving is completed. With the pegs, straighten the canes and force the pairs together, forming in this way small open squares over the entire area.

Step 5. This step is the weaving of one set of diagonals. Start the strand at a corner hole. In rectangular caned areas two canes are invariably drawn in the corner holes. This permits all diagonals to run straight, a very essential thing. It is in this step and the succeeding one that a particular error is most easily and frequently made. Use one hand over and one under



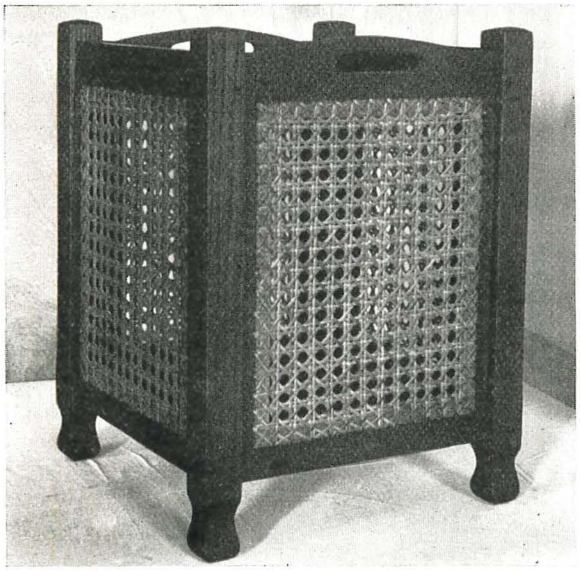
NEEDLE USED IN CANING.

the frame. The whole may be strung very rapidly in this way as twists are easily avoided. The strand should not be drawn thru its entire remaining length at each square, under a cane at the corners of the squares when correctly done. It will pull with difficulty, and will bind at the corners of the squares when incorrectly done. On paral-



THE SEVEN STEPS IN CANING.

as a general thing, but merely use an end long enough for convenient handling, and pull it thru when it has been run the length of the frame. Now as to the possible error. The cane will pull easily and run partially lel canes, also, the diagonals will either run over or under. If they do both, a mistake is obvious. If the possibility of mistake is kept in mind, it may be easily avoided.



A Caned Waste Basket.

Step 6. This step is identical to the preceding one. The canes run at right angles to the first diagonal ones, and two go into corner holes as suggested.

Step 7. The addition of a binder is, in areas for decorative purposes, purely a matter of taste. On chair seats it undoubtedly adds to the life of the seat. Pull up a cane thru a hole, over the binder, and down thru the same hole. A loop is thus formed and the binder secured. Pull up the cane thru the next hole, over the binder and down, and so on. This operation may be repeated at every other hole in cases where very fine cane is used and the holes, as a consequence, are close together.

Ends of canes left over from one step or series may be used in succeeding ones without cutting off, provided it is not necessary to carry them over more than four or five holes on the under side.

A binder of wood may be used on a hand caned frame if desired. It is only necessary to run a groove about a fourth of an inch deep parallel with the row of holes and as wide as their diameter. The wood strip is then mitered and nailed on after the area is caned.

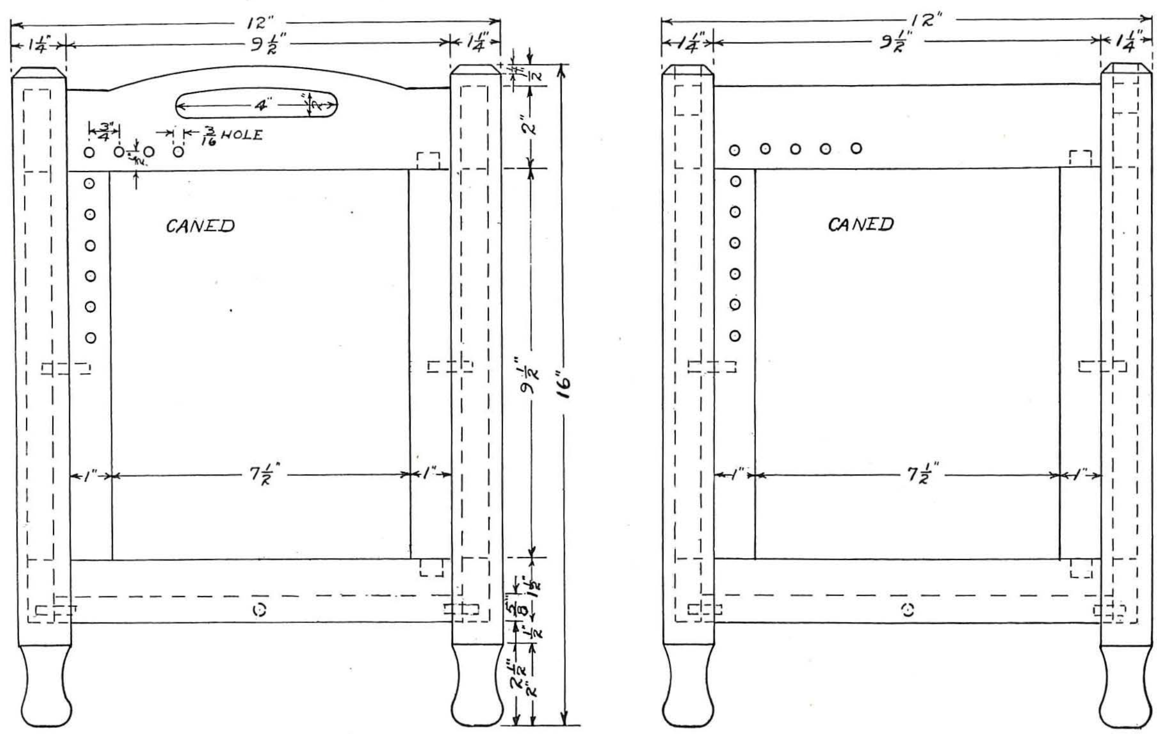
It is sometimes advisable to cover up the cane on the back or inside. This is necessary in places exposed to view, as on the inside of the caned frame of the Morris Chair shown herewith. To do this use a quarter-inch stock of the proper proportionate width, and run a groove along the center an eighth of an inch deep. Miter the corners and nail in place. This makes a neat, pleasing cover.

Holes will frequently fill up with cane making it either difficult or impossible to draw cane thru. Force a scratch awl down thru and turn it several times. This will effectively force an opening.

In areas other than rectangular, and especially round, weaving is begun by drawing cane thru holes as near the center as possible and working both ways. This applies to the first two steps. The first four steps must pair and run in holes opposite each other. In order to keep horizontal and vertical canes equidistant, some holes must be skipped. It is frequently necessary to run several diagonal canes into one hole, to keep them straight.

Use a sponge or cloth to keep the cane damp. This not only applies to the strand being used, but to the partially woven area as well.

To make sure of a neat piece of caning be particularly careful that the diagonal canes are woven in properly, immediately upon coming thru and upon entering a hole. Many otherwise excellently caned areas are spoiled by ragged, improperly woven edges.

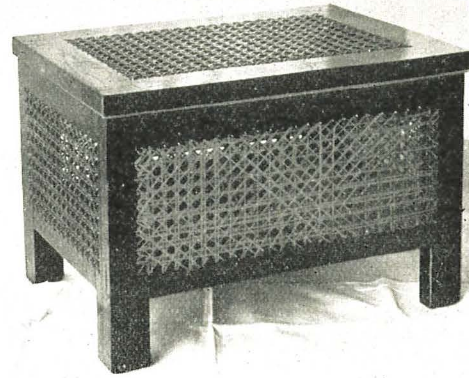


DRAWING OF CANED WASTE BASKET.
Made by Student in the Joliet High School, Joliet, Ill.

The size of cane is the determining factor in the size of the holes to be made and the distances between them. This varies from one-eighth of an inch to one-fourth of an inch in diameter for the holes, and from three-eighths of an inch to an inch for the distance between them. Fine fine, fine and medium are perhaps the best sizes to use for shop work and are perhaps the most used commercially. A small amount of medium binding cane should be kept on hand. Judgment will determine proper measurements for a given size cane.

An error in caning, shown in the photograph of the steps, may prove of value. This error is the one cautioned against in discussing the fifth step, and will serve to illustrate concretely how *not* to run the diagonals. In the lower right-hand square, the fourth diagonal from the lower left-hand corner has been woven wrong. The mistake is not pronounced here, but repeated in a larger frame, it would become very evident. As heretofore suggested, note that the diagonals on parallel lines of cane either run *over* or *under*. This particular cane runs *under* whereas all others run *over*, on the vertical, and *over* on the horizontal where all others run *under*. As mentioned before, the cane also binds at the corners of the squares.

The pieces of furniture shown in the photograph are not too difficult for eighth-grade boys, for they have been made by such. The Caned Box has a hinged top and is very serviceable for rubbers and shoes. No drawing accompanies it. The Morris Chair shown is made from the working drawing of the Morris Chair and Detail Sheet, except that the turning has been omitted. The upholstered seat is shop work; not outside or commercial. A very satisfactory problem is the Waste Paper Basket. A variety of designs is possible in this, each employing cane. A working drawing accompanies the photograph. Note especially on the Detail Sheet, the detail of a corner for caning as regards dimensions for fine fine cane. The Table and Stool are not accompanied by drawings.



Caned Box With Hinged Top.

In several instances the cane performs a function, while in others it is used for purely decorative purposes. Here are brought into play the two aspects of design—the element of formal beauty, and the element of utility—mentioned in the introduction. Inasmuch as progress in aesthetic judgment is by way of study of beautiful individual things, it becomes incumbent upon the Manual Training instructor to permit the construction of only well proportioned and balanced articles. He must teach the fundamentals of good design, and must appreciate the fact that the first consideration in all construction work is, with all it implies, beauty. So it is that any medium in the shops, which in a measure helps in inculcating an appreciation of good design, should be adopted. One such medium is cane weaving.

A TRADE SCHOOL AND ITS PRODUCT

E. H. Fish, Worcester, Mass.

THE cost of designing and trying out machinery before it can be safely put on the market and the cost of selling, are two items that are incidental to the running of any shop and of course to the running of a trade school shop, if it is a real shop. In the profit paying shop they constitute a burden which is shifted to the purchaser of the product in the added price which he must pay. A shop which changes design only once in a decade can sell for less than one that brings out improvements every year, or as often as the spirit moves. The shop with an unvarying product can, to some degree, lean on its past record and do a comfortable business without much further selling cost.

There is, therefore, a serious problem confronting a trade school. Cost of design and cost of selling are also incidentals to them, but they have no such direct bearing on the value of the finished product, because the finished product is men and not machinery. The latter is their by-product. Motives of economy, possibly also of laziness, would prompt a school to adopt one line of manufacture, getting patterns and drawings once for all, and making arrangements with some dealer to dispose of the by-product.

Motives of pride and ambition on the other hand, point to such a selection of work as will bring the largest variety possible. If the corps of instructors does not include a designer with the ambition to turn out original work even tho he was "not hired to design," or if it does not include someone with the selling faculty, there is another way that does not leave the school open to the criticism that its influence is narrowing, and that is thru co-operation with going shops.

Almost any machineshop has, in reasonably good times, an abundance of work that is of such a nature that it can place an order for a number of parts or units and then go about its business forgetting the order until the product comes in. It will then place these parts on its shelves and use from them as it would from home-made stock. The price at which a school should make

such work should be the cost of making it in the customer's shop less a small amount for use of such tools as the school shop may be obliged to borrow, and another very small amount to cover the cost of storing after it is received, until it is used. The use of such work has a multiplicity of advantages, not the least of which is the education in drawing systems that comes about thru the use by the pupils of drawings made in a variety of offices. No two shops use exactly the same short cuts, nomenclature or conventionalities. Their methods of dimensioning are different. One will run to the use of sections and another will send in drawings so covered with dotted lines that it can hardly be read at all. One will send in a drawing that is clear, and another will be so sure that the drawing is useless outside its own shop, that it will mark it all over with a red pencil before sending it out.

Then again, the advantage of inspection by strangers is always a good influence. This is more clearly brought out when parts are made, because then each is of necessity inspected by itself and the criticism is direct and accurate. If a shaft is thrown out because it is .001 smaller than the limit given, it can be checked up, and if the inspector's micrometers were measuring .002 off size he can be called to account for it. But, if a shop builds and sends out lathe chucks, or shapers or any other complete product that goes direct to the user, it is always subject to the criticism that the thing is no good. All the fits are too tight (or too loose) and even the paint was put on wrong side out, which is not a criticism, but an exhibit of a "grouch."

It is easy to say that the instructors in a trade school should inspect piece by piece and operation by operation, but that is not so easy to do in an effective way. Instructor and pupil together are responsible for the quality of the product. My experience has been that much more work is spoiled thru lack of complete instructions, or lack of understanding of instructions—which is the fault of the instructor—than by the boy's failure to carry out his orders, or use proper care. This does not signify that no boys are careless or willfully inclined, but that a shop trained instructor has learned so much from observation that it all appears perfectly obvious to him.

Even with much co-operation of this sort there is still a lack of an all-around training in any shop unless there is something of the engineering side to its operation. There should always be kept in mind the difference between building machinery and manufacturing it. I for one believe that the largest openings are for young men who have had a pretty thoro training in a shop where much is going on that demands initiative and invention on the spot. In a shop where a standard product is made, where every day's work is like every other day's, there is a minimum of education even tho there is a maximum of production. Even in a shop where each man gets a considerable variety of work but where it is all done in jigs and fixtures, too much is sacrificed that a boy ought to learn. If he can pick up any piece of work from the floor and strap it on the planer table, in such a way that he can go ahead with the assurance that he can do something more than nibble at it, without its falling off on his toes, he can go into any shop and put a piece in a fixture and do the same. If he can set a piece up on a miller table, or on the face plate of a lathe, and bore a hole to a given center, he will have no trouble in drilling thru a jig if that falls to his lot to do on the job. A school shop should always be doing some foolish things. It should bore and turn a flywheel that could have been done outside for less money than the time of the instructor is worth, while he is standing over the job, because by so doing all the pupils that see the job done realize that the apparent limitations of machine tools are not altogether real. It should build its own elevator, not because it can save money, for it probably cannot, but for the sake of the experience that every boy that comes in contact with the job gets in seeing an unusual job carried thru in an unusual way. The conventional ways of doing work are, of course, of first importance, but the boy's mechanical education has only reached the "reading, riting and rithmetic" stage, when he has gone only that far. He may at that stage be fitted to make a good specialist but he will make a better one if he gets at the principles of doing work in original ways.

Another thing that should have a very considerable influence on the selection of a product to be made, is the necessity of providing live work for the boys who are learning the trades of patternmaker or draftsman. Both these trades can be most easily supplied with work if there are new designs going thru the machineshop all the time. It is almost impossible to enthuse boys about a drawing, or a pattern, either if they know that it is not to be used. If they are not enthusiastic about their work there is little chance of their getting much out of it. Then again, while teaching machine design is not a legitimate part of trade training, the man who teaches drawing should be one who is able to design. If he is not at least that much in advance of his pupils, he is not far enough ahead but that some of his brighter boys will outstrip him.

EVERY noble work is at first "impossible." In very truth, for every noble work the possibilities will lie diffused through immensity; inarticulate, undiscoverable except to faith.

Thomas Carlyle

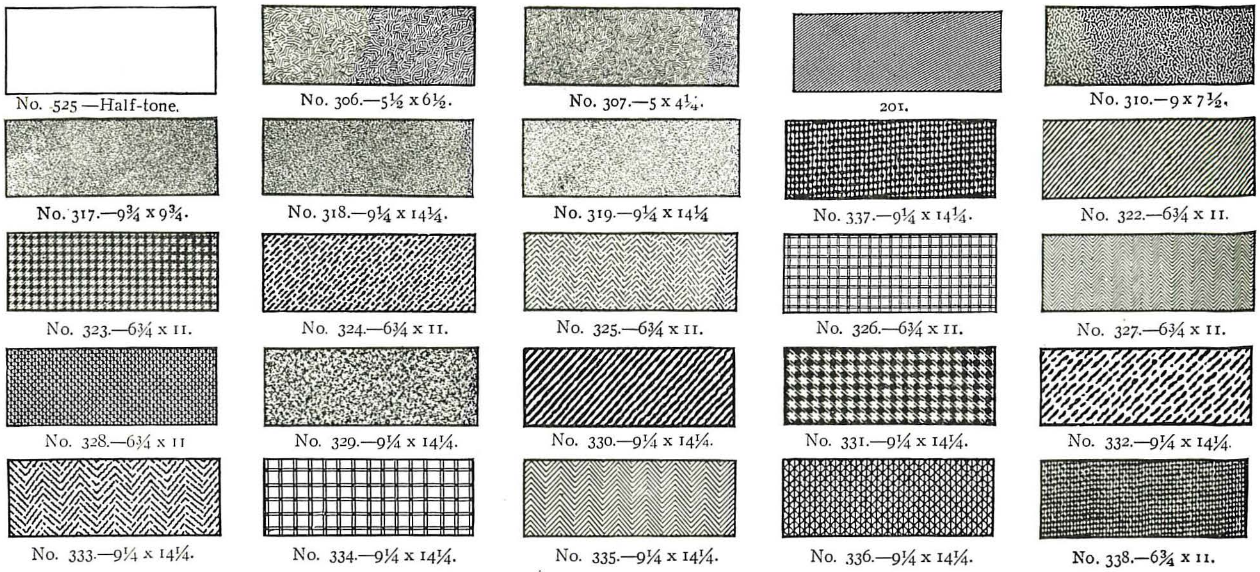


ILLUSTRATION 25.

COSTUME DESIGN AND ILLUSTRATION

Ethel H. Traphagen

(Third Article)

Methods.

SOME mechanical helps and short cuts to results and effects are Ben Day rapid shading mediums, Ross board, Spatter air brush and silver prints. Ben Day is a great time-saver as can be seen from even the few samples here shown of some of the complicated textiles and halftone effects obtainable in the line cut or ink drawing. See Illustration Number 25.

When Ben Day is desired the places where it is to be used are colored with a blue pencil, or blue water color wash and marked with the number of the texture wanted; the engraver with the Ben Day machine does the rest.

Ross board comes in a variety of designs. The three most used kinds are perhaps the plain white with raised or embossed texture, the smooth white with black texture and the cross ruled blind with black texture. A knife and pencil are the tools used to obtain effects with this paper. See illustration Number 26. In the first the stipple effect is obtained by rubbing the pencil over the plain white and the raised surface, which in this case is dots. These catch the lead and a stipple effect is the result. In the second, white can be obtained by scraping off the surface and a darker tone by rubbing a pencil on the rough surface. Two effects can be obtained with the third; while the knife the *stipple* surface, with the pencil the fine check. Black can be put in with ink. This makes possible an even gradation from white to dead black.

Spatter work is done with a tooth brush, and makes good flat tone effects, posters and backgrounds. Cover the entire drawing with paper except the parts to be spattered, cutting these parts out to make what is practically a stencil, (tracing paper fastened down with rubber cement is convenient). First dip the tooth brush into a saucer of ink, hold it facing the paper, about three feet away and draw the edge of a pen knife or the handle of a pen or brush over the bristles toward you letting the spatter fly onto the drawing. With a little practice this can be done skillfully. See illustration Number 27.

The air brush gives as desired either an even or a varied tone and in the doing of halftones of shoes it is

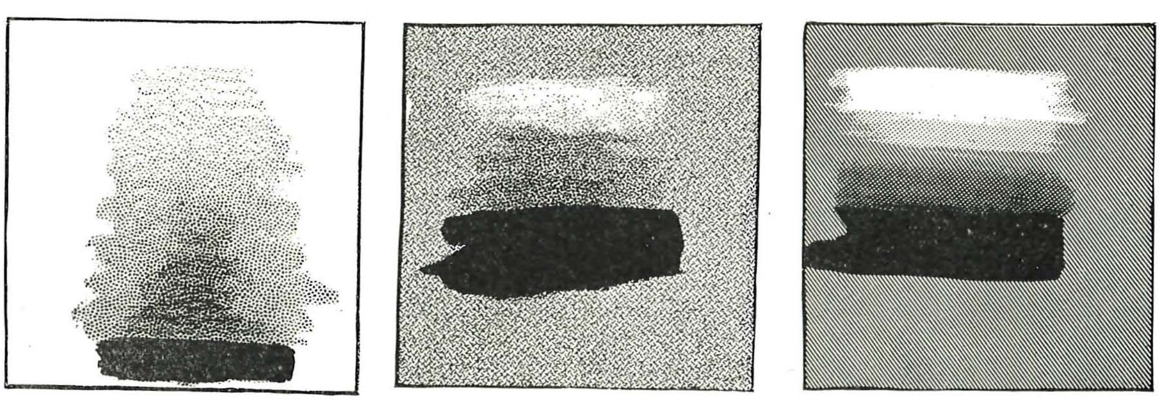


ILLUSTRATION 26. ROSS BOARD: EMBOSSED WHITE, SMOOTH BLACK TEXTURE AND CROSS RULED.

Permission, Ward & Gow. ILLUSTRATION 27.

found very useful. It is really an atomizer run by pressure and thru it a great variety of tone can be obtained. See illustration Number 28. As in spatter work the surface of the paper to be kept white is covered. Frisket paper which is thin and transparent is used for this purpose and pasted down with rubber cement. When the rubber cement is thoroly dry it can be rubbed off leaving a perfectly clean surface. The effect is photographic and mechanical. See illustration Number 29.

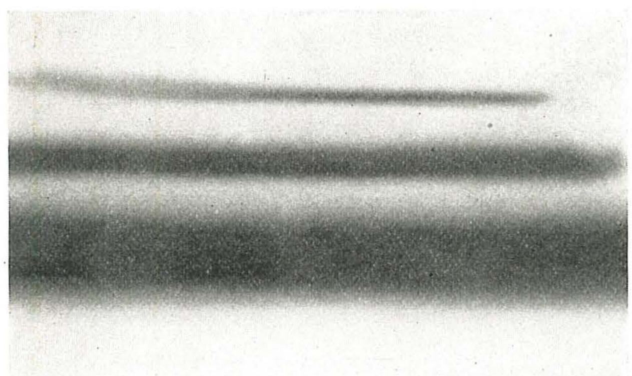
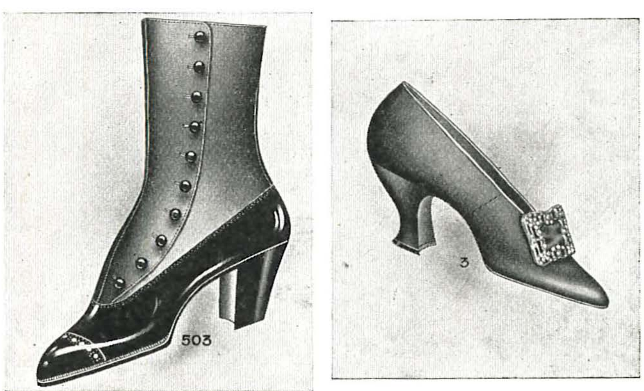
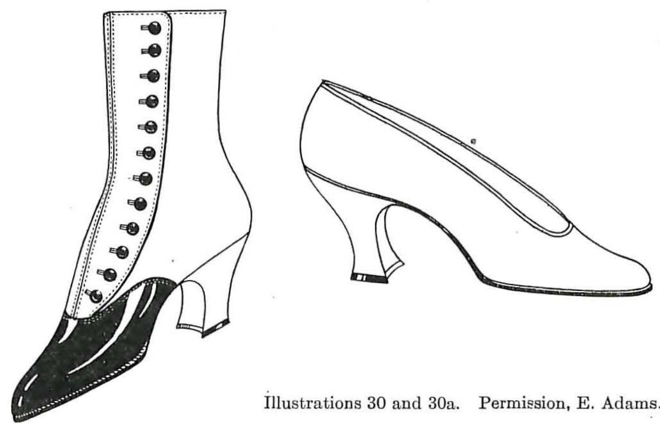


Illustration 28.

The Silver Print method is often used for making line cuts or pen drawings of shoes. For this purpose a silver print photograph is made in a size convenient to work over on Clemmon's plain salted paper and mounted on card board to get a smooth surface for drawing. Outlines are then carefully traced with usual pens and India-ink, doing deep shadows first and gradually working up to the high lights. When finished the silver or photograph color is bleached away by pouring over it a saturated solution of bichloride of mercury. This leaves the pen lines clean and sharp upon a perfectly white sheet of paper. When dry it should be compared with original photograph and touched up where necessary. See illustration Number 30 and 30a.



Permission J. & J. Slater. Illustration 29.



Illustrations 30 and 30a. Permission, E. Adams.

Tracing.

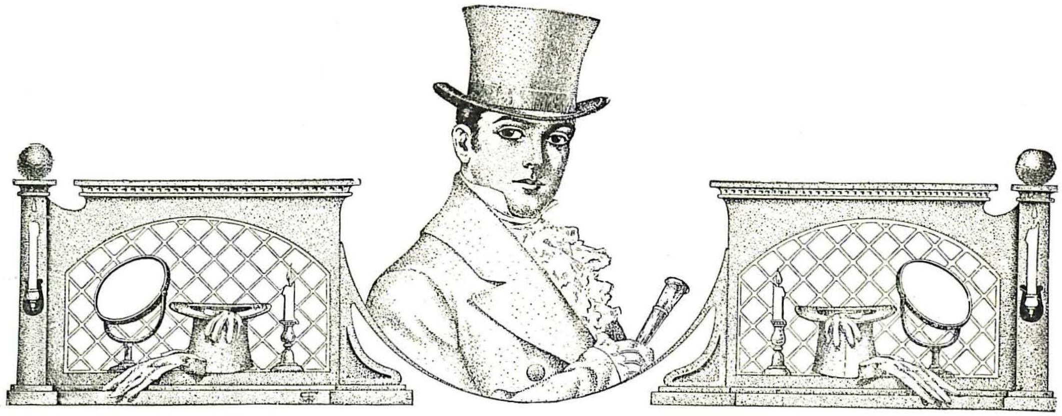
Tracing is often found necessary and is a time-saver in doing repeats, etc. Graphite paper gives a better line in transferring than carbon paper.

The pencil should be kept very sharp when tracing and a six "H" pencil is good for doing the transferring thru the carbon. Black squares are useful to put under thin paper in doing some kinds of designs.

Stipple, which takes a long time, is done by dots made with the point of the pen. When a flat tone effect is desired it is often done in sets of circles running into each other. If large dots are required it is found convenient to use a ball pointed pen. Artistic and interesting effects can be obtained in this manner. See illustration Number 31.

Silhouette.

The Silhouette is a very quick method of gaining an effect, being merely an outline sketch, usually profile, filled in with black ink. See illustration Number 32. White is sometimes successfully added as in illustration



Permission, Abraham & Straus. ILLUSTRATION 31.

Number 33. Silhouette is, in fact, so showy and yet so economical of one's time that it is interesting to note that it was called after Etienne de Silhouette, minister of finance to France in 1759, whose public economy, in trying to avert national bankruptcy caused his name to be given to things ostentatiously cheap. Halftone figures are said to be silhouetted when the white paper appears as the background. A silhouette is a design sharply defined, the clear outlines of the drawing coming directly against the paper on which it is reproduced.

ILLUSTRATION 32.

A vignette is a silhouette having at the base or behind the figure, or in some part of the design of the figure a wash that disappears in a vague shadowy effect. This wash is reproduced only in tone and has no definite line marking its edges, which end in an indefinite vagueness such as the veil ends and shadow background in illustration Number 37.

Constructing an Oval.

With compass measure from A to B, then put compass at C and strike a circle indicated by dotted line from D to E and where the circle intersects the horizontal line at D and E place pins, (see illustration Number 34), also at point C. Stretch a thread from E to D around C and tie together at C. Remove pin at C and holding pencil perpendicularly describe the elipse shown. See illustration Number 35.

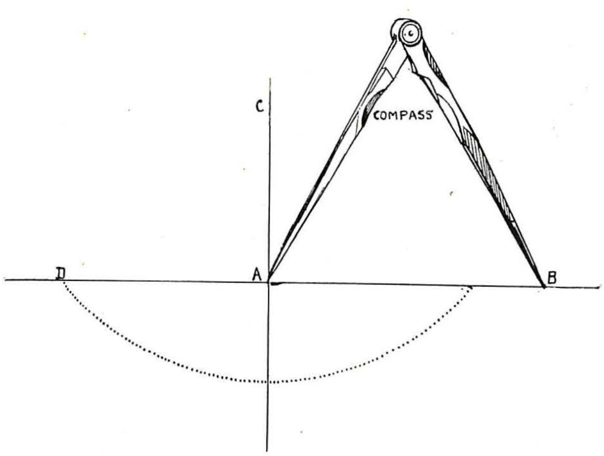


Illustration 34.

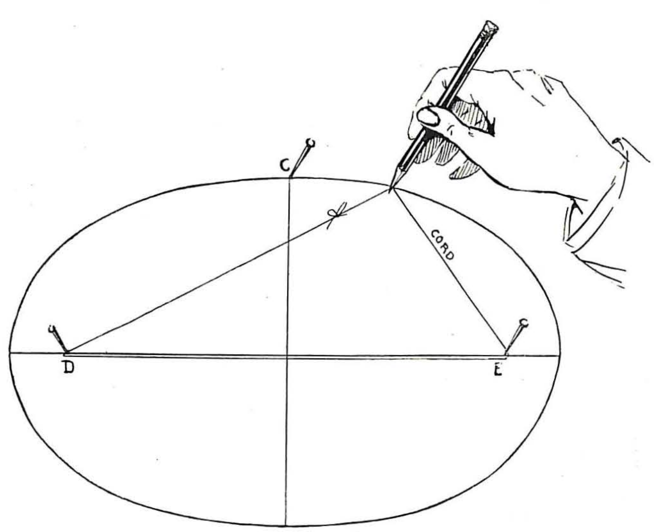


Illustration 35.

Illustration 33.

"Swipe Collection" is the commercial and expressive term for what most artists call documents, and this is one of the most important items under the list of materials. It consists of examples clipped from everywhere, catalogs, booklets, magazines and newspapers, illustrating different technic and the expression of numerous textures, plaids, stripes, velvets and detail of all kinds. These are not to be used as copies but as teachers showing ways that have been used with success. Copying is one way of studying but is advisable only when done with intelligence. See illustration of a "Swipe," Numbers 36 and 36a, 37 and 37a, showing a case of one drawing suggesting the pose for another.

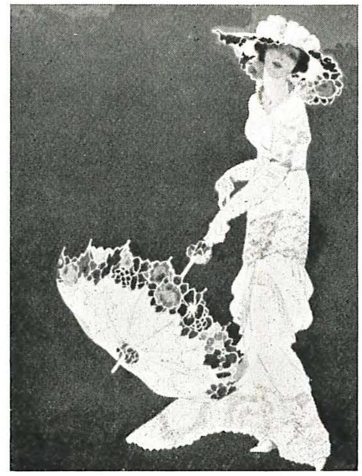


Illustration 36. The Original. Permission, Vogue.

Illustration 36a.
The Adaptation.
Permission, Gimbel Bros.

Illustration 37. The Original. Permission, N. Y. Globe.

Illustration 37a. The Adaptation. Permission, Gimbel Bros.

ELEMENTARY MECHANISMS

Ray F. Kuns, Cincinnati, O.

(Sixth Article)

WATER MOTORS.

THE water motor is a problem of interest to many city boys inasmuch as it is a ready means of obtaining light power. Several models, or types, each designed to operate on the city water supply, are shown. As in all work of this nature the cost item must be considered. If the standard type of coupling used in connecting rubber hose to faucets is figured on, it will be found that the expense is prohibitive in many cases. In fact it will likely be found that the expense of connecting exceeds the entire cost of constructing the motor. The Type A motor requires no hose or couplings, while the Type B motor requires both.

It is a very difficult matter to calculate the power of motors of this size. The strength of the water pressure varies greatly. So also does the quality of the work of different boys. However, either of these motors, if well made, having a perfectly balanced wheel and good shaft and bearings, will develop approximately 1/4 H. P. on good pressure.

Water Motor Type A.

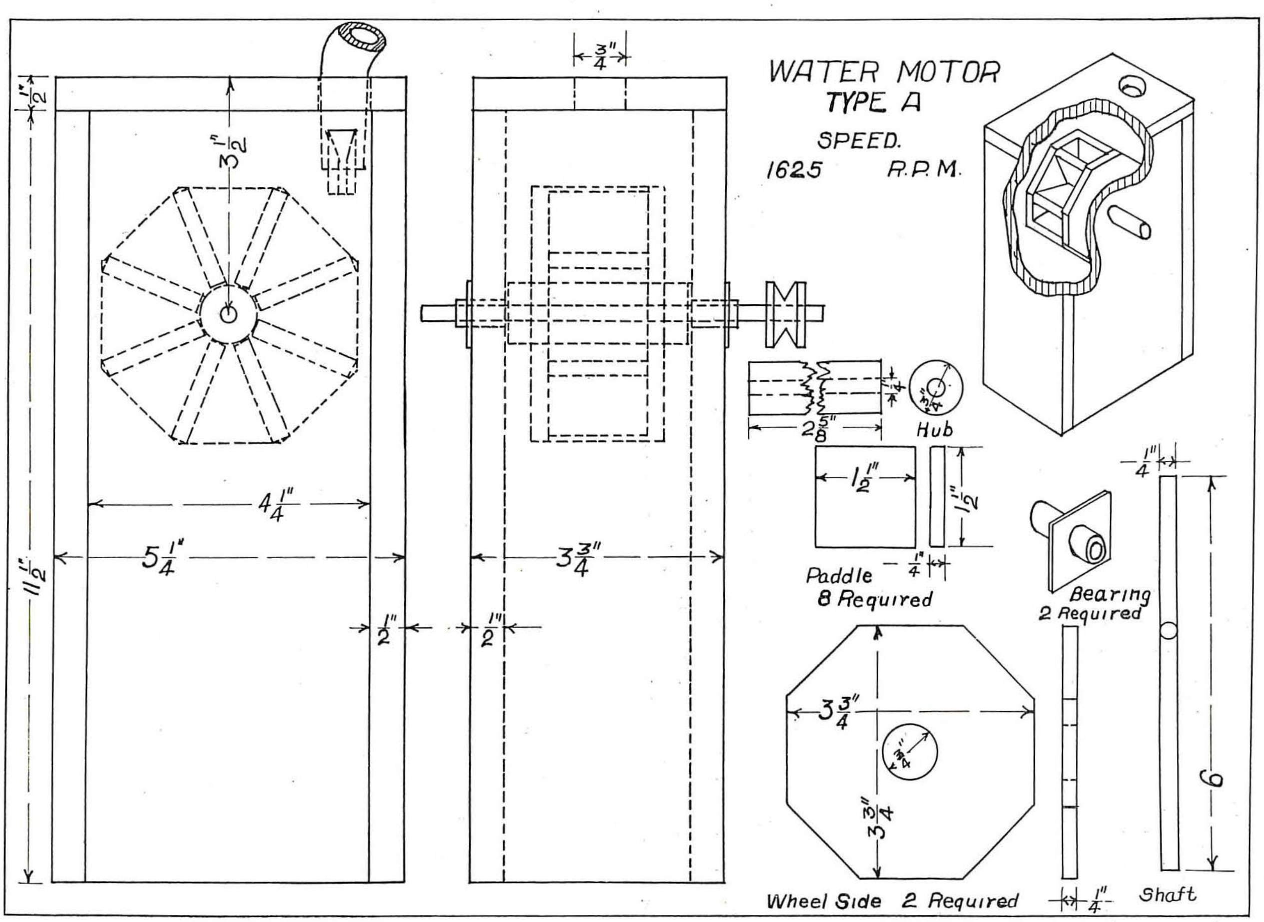
Case. This is constructed entirely of wood. A close grained soft variety is perhaps best altho almost any kind may be used. The construction is very simple as a plain butt joint is used thruout. The bottom is left entirely open to permit the water to escape. The top is covered and has a 3/4 inch hole bored in it to permit the end of the faucet to enter the case as shown. In assembling use either screws or nails as preferred. If screws are used the case is readily taken apart, which is a distinct advantage.

The holes in the sides of the case for the bearings may be left until all other work is done on it, in order that they may be properly located. The size of the bearings will determine the size bit to bore them with.

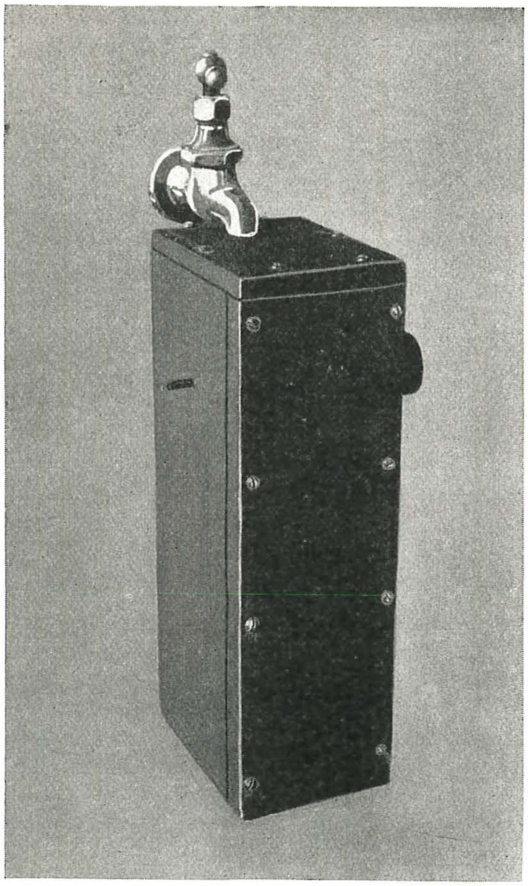
Wheel Sides. As shown in the drawing these are octagonal pieces of thin lumber. While this method is entirely satisfactory, another and just as good is to take several tin can lids such as come on Crisco or molasses cans, lay off for eight paddles and fasten them in with nails.

Paddles. In working these out a strip is planed to the proper width and then cut into pieces of the proper length for the paddles. When nailing the wheel together, edge grain should be placed to the side of the wheel rather than end grain. The danger of the paddles splitting is far less than that of the wheel coming apart if insecurely nailed as is the case when the nails are driven into the end grain.

Hub. A piece of 3/4 inch dowel rod serves here. If



PLANS FOR WATER MOTOR, TYPE A.



WATER MOTOR, TYPE A.
Built in Oyler School Shop by Students of the Author.

the wood sides are used it should be worked out to the size shown. In case the tin lids are used it would be best to make it just as long as the paddles, placing other short pieces on the outsides in order to keep the wheel in the middle of the case.

Shaft. This is made from a piece of cold rolled brass or steel. It is held securely in its position in the wheel by means of an iron pin driven into a hole drilled thru hub and shaft at one side of the wheel. The hub is in turn nailed in its position. If the tin sides are used the shaft is soldered to them.

Bearings. A sketch of one of these is shown. A piece of 1/16 inch seamless drawn brass tubing is used for the bearing proper. The inside diameter should be the same as that of the shaft, or a very little larger. In case it is too close a fit it may be stretched a trifle by the following method: First place shaft in position in the bearing, even if this should necessitate driving it on. Next lay the assembled parts on the anvil and hammer the bearing, not too hard, all the way round. In case this should fail to do the work several light cuts may be made in the bearing by means of the cold chisel. These bearings should be one inch long and when they are working easily on the shaft they may have a piece of sheet brass or tin 1½ inches square soldered on each one as shown and an oil hole drilled in them.

Assembling. The wheel may now be assembled in position, having the bearings carefully located and securely fastened to the sides of the case. The case may next be securely fastened together.

Feet or some sort of frame to hold the motor in position when in operation may be worked out to suit individual needs.

Pulley. This may be of any design suitable to the builder, but should not be too large. If nothing better is at hand a spool may be used.

Operating. As before stated this motor is connected direct to the faucet and does not require any rubber hose. The end of the faucet however is plugged with a piece of ½ inch dowel which has a 3/16 inch hole bored in its center. Without this plug which serves to concentrate the water into a strong swift jet, no real power will be obtained.

Paint. While this is not necessary the life of the motor will be greatly lengthened if it is given several coats on the inside as well as outside.

Water Motor Type B.

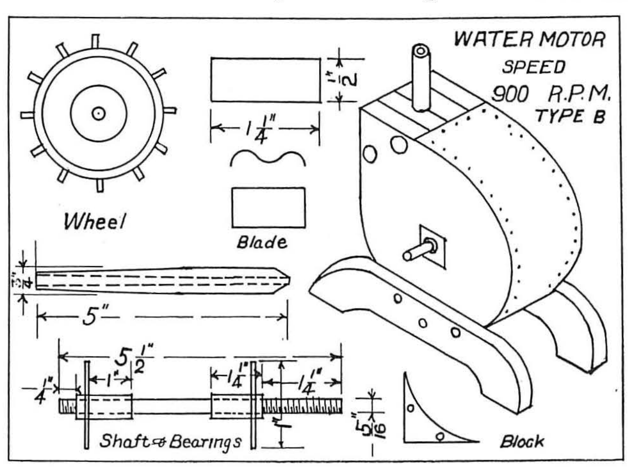
Secure two lard pail lids or similar tin can lids about 5 or 6 inches in diameter. Fit a wheel made of ¼ inch soft wood and fasten them together with nails keeping the wood on the outside. Clinch the nails to hold the parts together and solder the lids together on the rim. This arrangement gives a U-shaped rim to the wheel in which to solder the paddles. Tack a smaller can lid or similar piece of tin over the center of wheel on each side. Locate the center of the wheel and drill a 5/16 inch hole thru it.

Paddles. Work out twelve of these, bending to shape shown at B and soldering in position on the rim of the wheel. The water should strike in the center of the paddle and on the high side.

Shaft. Made from cold rolled brass or steel. Nuts are placed on the ends of it to keep the wheel in position in the center of the case. The wheel is attached to the shaft by means of solder. The small can lids were placed on it for this purpose.

Bearings. These are worked out in the same manner as for the other type of motor. Care must be taken to obtain the proper size tubing.

Case. The sides of this are of ⅞ inch poplar or other soft wood. Lay off a circle having a diameter at least two inches greater than that of the wheel. This allows a space for the waste water to escape without retarding the speed of the motor. Allow one corner of the board to remain square working the rest to the



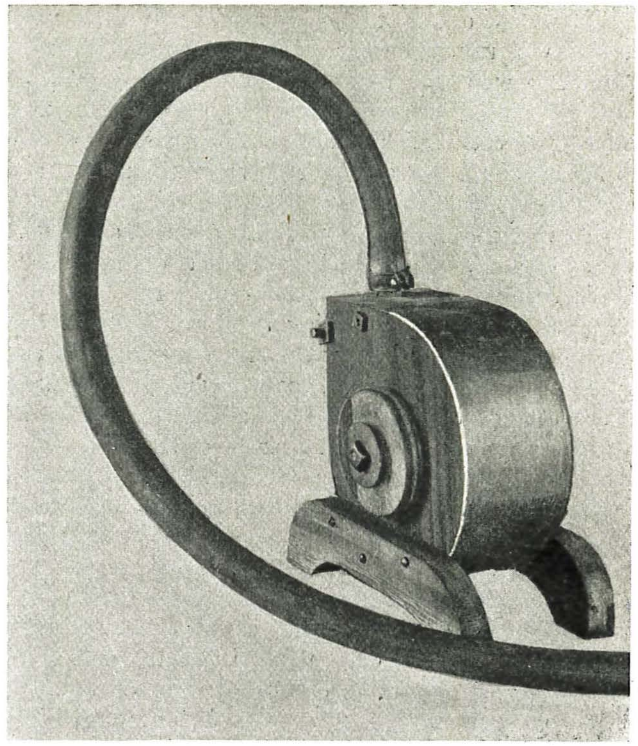
Plans for Water Motor, Type B.

circle. Bore the holes for the bearings and countersink them from the inside to a depth of ½ inch. This is to obviate the danger of the bearings being thrown out of alignment when the sides are affected by the water. Two blocks are worked out similar to the one shown in the sketch. These are ⅞ inch thick and may be made to come within ½ inch of the paddles. These blocks are bolted between the two sides and serve to hold them together as well as forming a place for boring the hole for the nozzle. Two ¼ inch bolts are used to hold the blocks and sides together.

Nozzle. This is made of a piece of ¾ inch dowel or broom handle. A 5/32 inch hole is bored in the lower end, while the other end has a larger hole bored in it. The upper end is tapered to allow of the hose being slipped onto it tight. The nozzle is fastened in place in a ¾ inch hole drilled in the case as shown, with the ends just clearing the paddles.

With all parts described above in position the case may be covered with tin leaving a space of about three inches open at the bottom for the waste water to escape. If the motor is to be used where the waste water must be conducted away an outlet may be soldered onto the open space just mentioned.

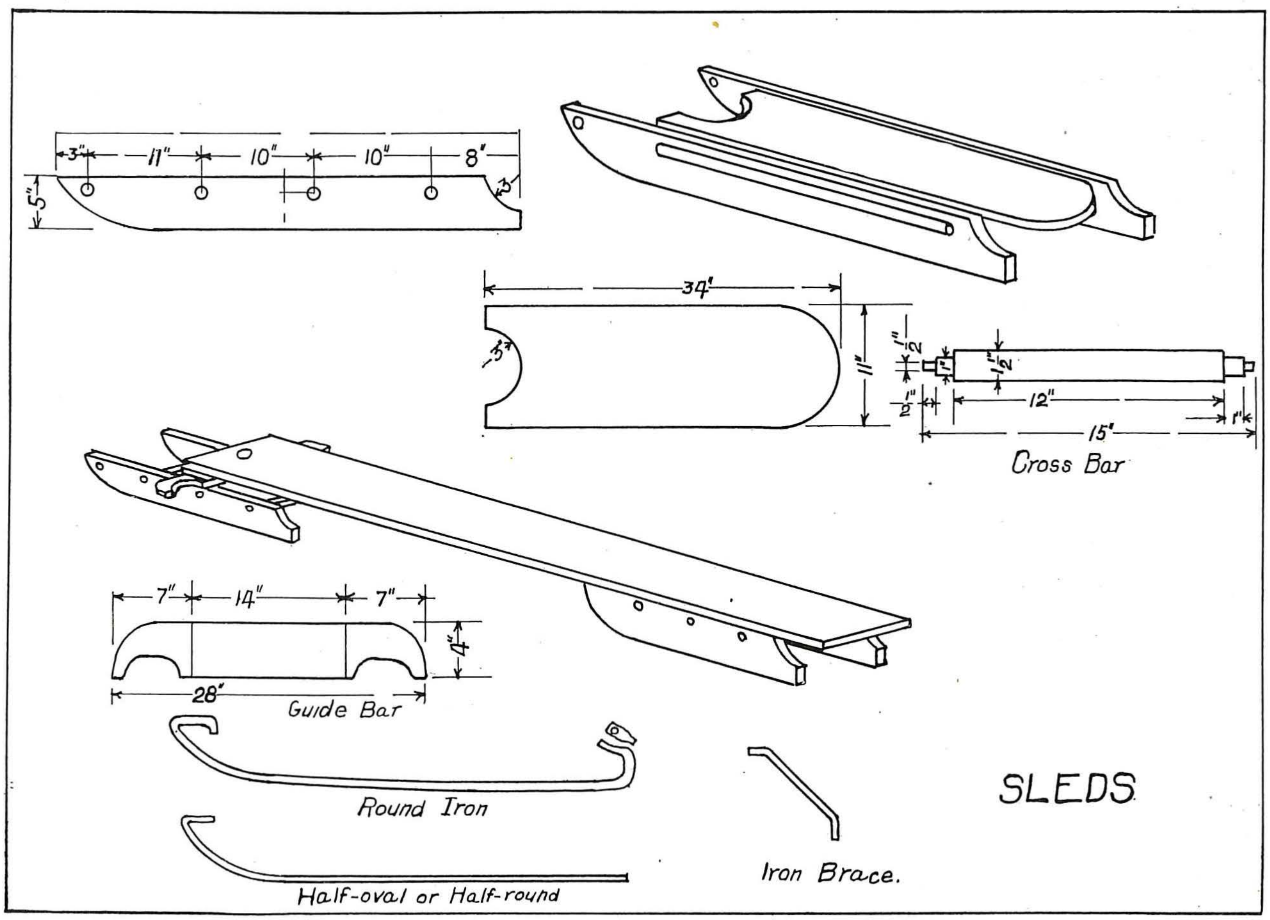
Feet to suit the requirements of the builder may be added.



WATER MOTOR, TYPE B.

Sleds.

While the sizes of the sleds shown are good they may be varied to suit the builder. If the runners are made over five inches wide or high two iron braces similar to the one shown on the drawing, should be run from each of the end cross pieces to the runners.



WORKING DRAWINGS FOR SLEDS BUILT IN OYLER SCHOOL SHOP.

Tires. If oak or some other good hardwood is used the sled will run very well without ironing the runners, still not so well as if this were done. Old wagon tires make good sled irons but 5/8 inch half oval or half round new iron is better. These are bent as suggested in the drawing, have holes drilled and countersunk for the screws and fastened on.

By using the 3/8 inch round iron a speedier sled will be the result. It will be noted that these tires have a little different shape, being high in the center, and that only one screw is used in fastening them on. The runner is held in a groove which runs from the middle of the runner to each end. This groove is cut 3/8 inch deep on the ends of the runner and is gradually run out as it approaches the center. In some cases there is no groove whatever for a distance of nearly one foot in the middle of the runner. The iron then tends to stand away from the wood which results in a very easy riding sled as there is a certain amount of spring to the runner.

Small Sled. The cross bars may be worked out from square stock as suggested, or old broom handles may be used. In any case, a round tenon is used as it obviates the danger of splitting the sides of the sled while working it up and practically does away with all danger of having a sled with the runners in wind. Glue is used in assembling the cross bars in the sides.

A small round tenon is cut on the end of the large one for fastening on the broom handles which are used for hand grips. This adds to the appearance of the sled and weakens it in no wise as is the case when hand holds are cut in the runners.

Sides. Soft wood if well ironed will prove very satisfactory for these but hardwood runners of maple or oak are better.

Top. This may be soft wood. The thickness of the top depends on the size of the sled, 1/2 inch being thick enough in most cases. Allowance for the thickness of the top must be made when boring the holes for the tenons in order to have the top of the runner even with the top of the sled.

Bob Sled. Two small sleds are first built up and then joined together by a long top board. The runners on the rear sled should, of course, be higher than those of the front one to compensate for the thickness of the steering bar which is fastened to the front sled, as well as the cleat placed under the front end of the top board. This top board should be fourteen inches wide and eight to ten feet long. It is fastened to the rear sled with screws. The steering bar is also fastened with heavy screws and should be placed in the center of the forward sled. The top is fastened to the steering bar by means of a 1/2 inch carriage bolt. Painting is worth while.

A LITTLE ARGUMENT ON GREAT PRINCIPLES

Individuality

"Mr. Frills," said Try Square impressively, "I have been asked whether so visionary an artist, like yourself, can draw a salary? Certainly, it has taken you months to set us aright before our friends."

"Well," replied Frills with a frown, "whatever 'reverses' our portraits may have had, you must admit that I have given them that great essential quality—individuality."

"Mr. Frills," said Try Square, "it seems to me that the emphasis you put on individuality makes it necessary to deal with the pupils as individuals.

"Now, how can a teacher deal with forty pupils in forty minutes and get a response from each pupil that is worth while? Is it not a sufficient task to impart the same information and get the same response from forty pupils in forty minutes?

"The teacher who attempts individual instruction under our school conditions must be like the old woman who lived in a shoe and had so many children she didn't know what to do."

"And so she is," replied Frills, "if she *does not know what to do.* I agree that it is a task to teach forty pupils collectively in forty minutes and impossible to deal with them individually. I shall never forget my first attempt.

"I was as busy as the old woman could have been and the results were as chaotic as hers.

"I did not know what to do."

"Then why expect the impossible of the teacher?" persisted Try Square. "Why not plan a definite exercise for all pupils to be done in a definite time and measure results by a common standard?"

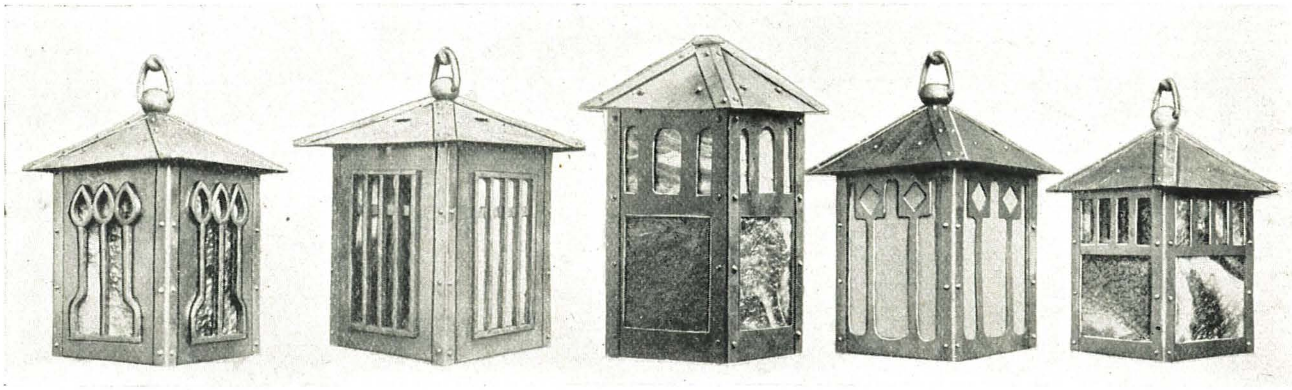
"Yes," replied Frills, "I believe that is a common practice in teaching, and it accounts for the eternal search on the part of teachers for a definite way of teaching a definite thing at a definite time and place. Teachers often lack executive ability."

"That is exactly what I contend, Mr. Frills," exclaimed Try Square. "The teacher must have executive oversight of his class to get results. He must plan the work so that each pupil is doing the same thing at the same time and in the same way.

"That is how successful business is always conducted."

"Yes," assented Frills, "successful business is conducted that way but the raw material is different in teaching than in business. Teaching is an Art as well as a business.

"I believe if the old lady who lived in a shoe had set the children to work about the place she would have had less trouble. But, the school teacher must do more than keep order and get the work done. The teacher must not only get material results *BUT*—"



LANTERNS DESIGNED AND FORGED BY MR. GOOGERTY.

ART SMITHING

Thomas Googerty, Pontiac, Ill.

(Seventh Article.)

Exercise No. 12.

THE lantern shown in Figure 66 consists of four sides which are fastened together with angles and rivets. The top is made from four pieces, with angles also riveted to them. The stock is cut with a pair of snip shears No. 06½. (See Figure 67.) The sides must be cut to the same size or there will be trouble in putting them together. After they are cut, the open work is marked with a slate pencil. Holes are drilled in the corners of each opening and they are cut out with a sharp chisel.

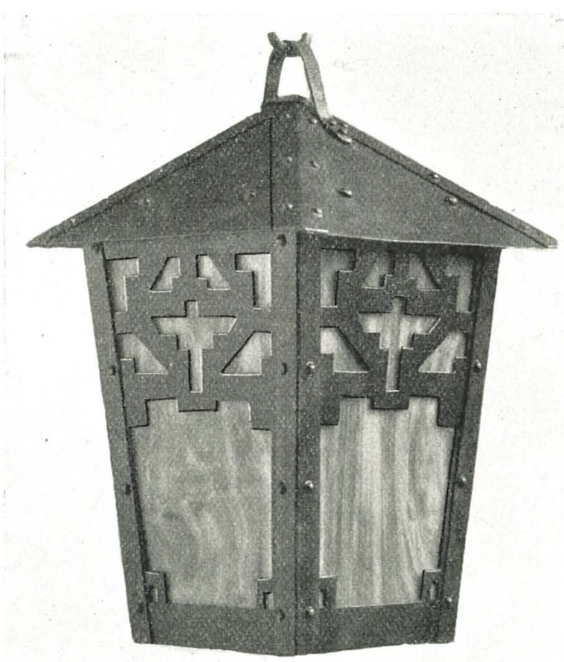


Fig. 66. Lantern.

The edges are filed and all holes drilled for a No. 12 rivet. At Figure 68 is a drawing, with dimensions of one of the sides as it should be in the flat. Notice the section of the sheet bent at the top for the roof and at the bottom to hold the glass. The glass is held in position at the top with a little strip of copper, with a rivet to hold it. The glass is set into the groove at the bottom and the copper cleat is bent over the top of the glass. The copper cleat should be ⅞ by ⅜ in., made from No.

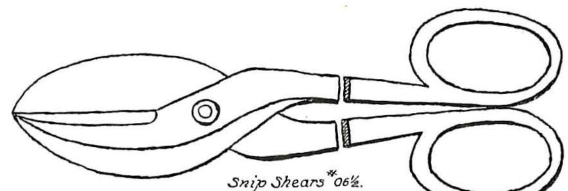


Fig. 67.

26 soft copper. The bottom of the sheet is first bent at right angles, then a flat piece 3/16 in. thick is laid on the inside of the sheet and the whole is placed on the anvil. The end of the sheet is now hammered over the 3/16

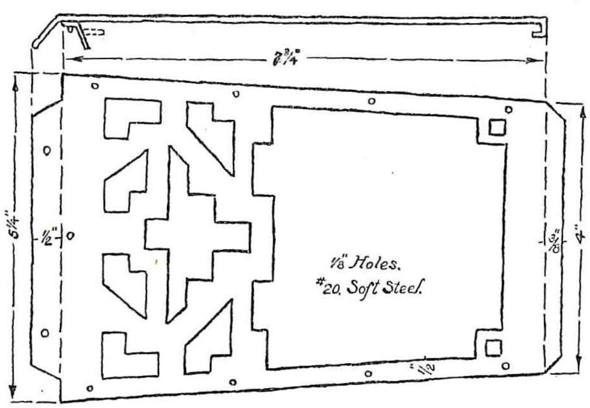


Fig. 68.

piece with a mallet to make the pocket to hold the glass. All of the holes for rivets to fasten the angles should be

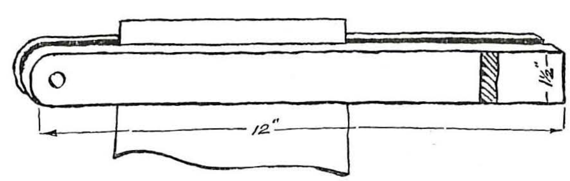


Fig. 69.

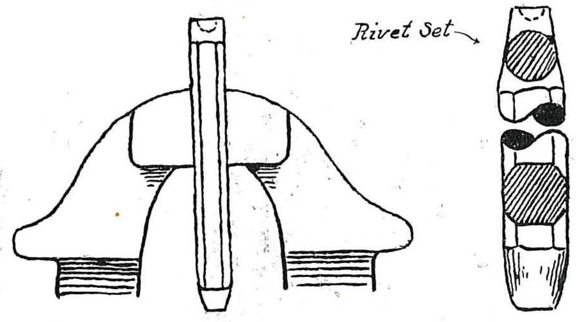


Fig. 70.

countersunk a little on the inside. The angles are made from one inch wide No. 20 hoop iron. They are formed by placing them between two pieces of flat iron as shown in Figure 69, and holding the whole in a vise while hammering with a wood mallet.

In fastening the angles to the sides, the heads of the rivets are on the outside, and the inside is smooth.

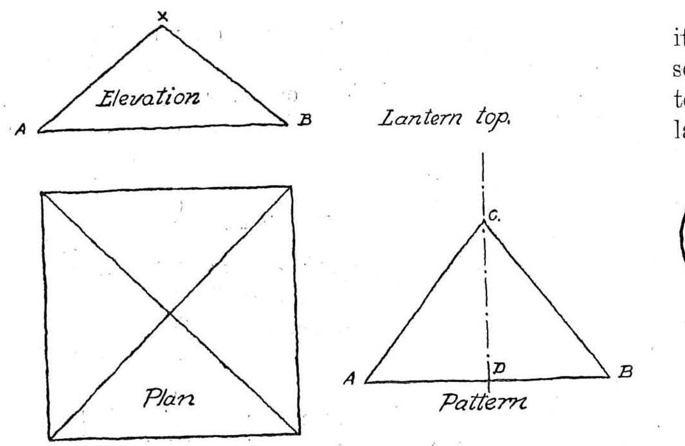


Fig. 71.

In doing this, the heads of the rivets are held in a rivet set while hammering on the inside.

The rivet set is caught in a vise as shown in Figure 70. A rivet set is a piece of steel with the shape of a rivet head sunken into one end. In making this, a punch is filed the shape of a rivet head and is then driven into

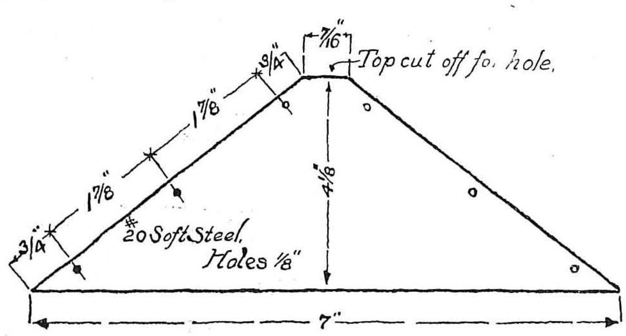


Fig. 72.

the end of a hot piece of steel. In Figure 71 is shown a simple method of developing a pattern of one section for the top of a lantern. A-B of the pattern is first drawn. The length of X-B (of the elevation) is the length (of C-D) of the pattern. Lines are then drawn from C to A and B. The point of each section at the top is cut off so that when they are riveted to the angles there will be a 7/16 inch hole thru the top. (See Figure 72.) In this hole is put a piece of 1/8 inch steam pipe with a lock nut on the top and the bottom to hold

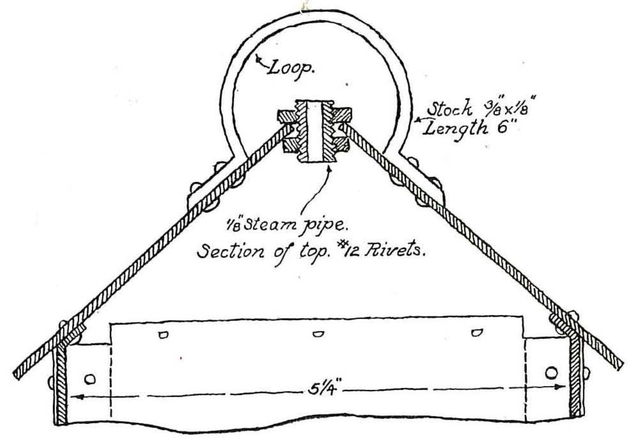


Fig. 73.

it in place. (See Figure 73.) The pipe is for the socket to screw onto under the top, and also for the wire to come thru. The loop at the top is to suspend the lantern by. It is made of 3/8 by 1/8 inch stock, 6 inches

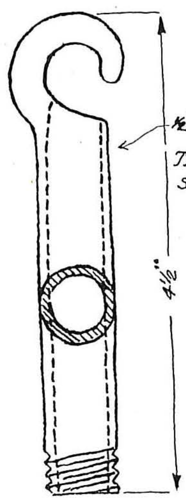


Fig. 74.

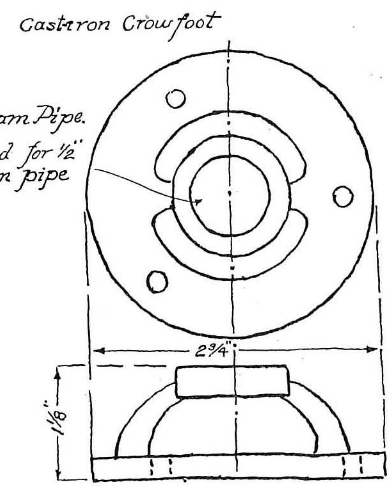


Fig. 75.

long. Two No. 10 rivets are put in each end to fasten it to the roof. The lamp is to hang by a chain suspended from the ceiling. In doing this a ceiling cap is neces-

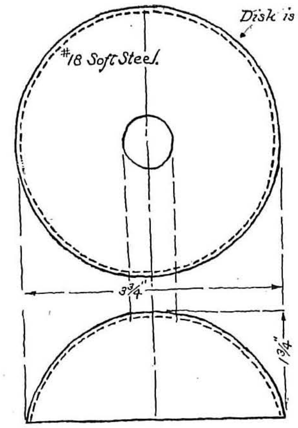


Fig. 76.

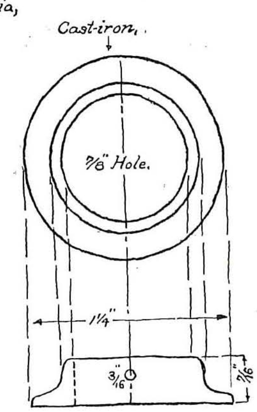


Fig. 77.

sary. This may be a piece of ½ inch steam pipe threaded on one end and a hook made on the other. (See drawing Figure 74.) A cast iron piece screwed on the end of the pipe, and then fastened to the ceiling by three screws, support the chain and lamp. The wires go thru the pipe and connect with other wires in the ceiling. (See drawing of the casting, Figure 75.) When the lamp is wired and the casting is fastened to the ceiling, it must be covered with something to hide the wires and its rough appearance. In Figure 76 is shown a drawing for a cap to cover the casting and wiring. The cap has a hole in the center for the pipe to pass thru, leaving it movable on the pipe. A collar of cast iron, with a set screw in the side, is to go under the cap and the screw tightened when the cap is against the ceiling. (See drawing of the collar, Figure 77.) In making the cap, it is heated

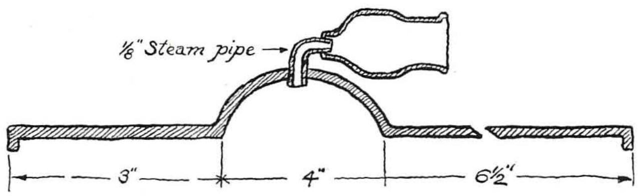


Fig. 79.

and hammered over a hole in the swage block. A hammer with a large-sized, rounded face is used. The disk is driven into the hole until it becomes bowl-shaped and the right height.

At Figure 78 is represented a lamp that is to be fastened to the side of the wall, instead of hanging from the ceiling with a chain. The light is inverted, the lamp being open at the top and the bottom closed.

The stock used in the construction of the lamp is very heavy, No. 14 soft steel being used. The angle plates on the corners are made from No. 20 soft steel. The plate that is on the back of the lamp has a cup-shaped pocket hammered into it to cover the wiring


Fig. 78.

when the lamp is in place, and on which the light socket is fastened.

At Figure 79 is shown a cross-section of the back plate, with the depression and socket in place.

This kind of lamp is very simple to make and can be made in various shapes and sizes. The back of the lamp can be made from wood instead of metal, if desired.

BOOK PLATES

Nancy Beyer

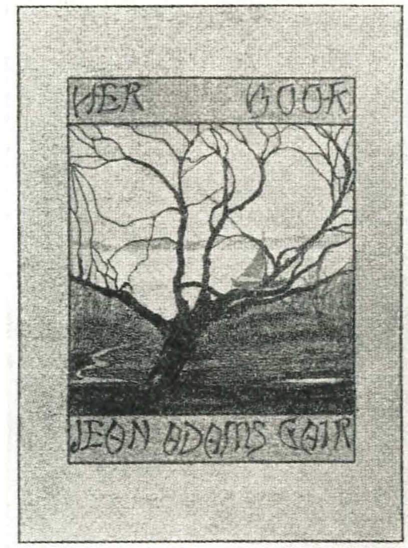
THE use of the book plate is one of the fashions of the present day and is likely to continue. The object in view is preservation against loss of books. To possess one's own book plate is most gratifying. There is satisfaction in a design commemorating some special incident in the life of the owner, as in the second plate, illustration No. 1, the old apple-tree with the familiar landscape.

The collecting of book plates has become a popular pursuit which has helped to increase the value of them. Rare and old book plates are the ones most prized. A few years ago one could step into an "old book shop" and, looking over old books, pick out an occasional volume containing a rare book plate, purchasing the book for a few cents. As soon as the pursuit of collecting became the fashion, however, the bookshop owners increased the price of books containing them.

The valuation of book plates varies. The absence of date or signature decreases the value of a design. A special value is placed on a book plate bearing a date, designed by some celebrated artist, or on one owned by a person who has risen above the common level, or on very old book plates regardless of date, signature or artist.

The custom of using book plates originated in Germany. The earliest known book plate was dated 1516. About that time Albrecht Duerer designed some book plates, which are the earliest known examples. The custom was followed in France, England, Austria, Sweden, Holland, Switzerland and America. The earliest known example of a French book plate is nothing more or less

1. F. W. Delehanty, Designer.



2. F. W. Delehanty, Designer.

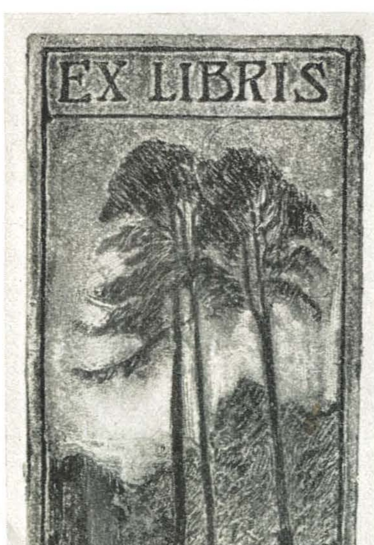
3. F. W. Delehanty, Designer.

ILLUSTRATION NO. 1.

than a label. Italy did not take kindly to the book plate before the seventeenth century.

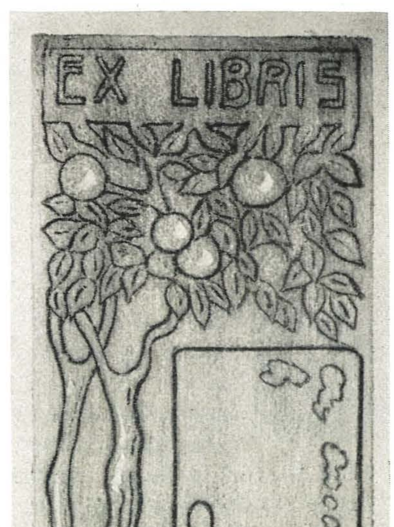
By the middle of the eighteenth century the book plate had formally established itself in America, first in use in the Southern states. The Northern states followed the fashion at a later date. As a larger part of the books bought in the early days of this country came from England, the first book plate in America probably was brought over from England already pasted in a book. Very few of the Southern plates were engraved by American engravers; nearly all were done in London. In the Northern states the custom being of a later date, the plates were the work of American engravers. The Southern plates were the best, for the American engravers were mostly self taught. The book plate of Paul Revere of the "Midnight Ride" is a very rare one, he having designed and engraved it himself. Some very rare book plates are those of George Washington, William Penn, Oliver Wendell Holmes, Daniel Webster and other men of letters.

The question of the fashion's sway upon the composition or ornamentation of book plates to the time of



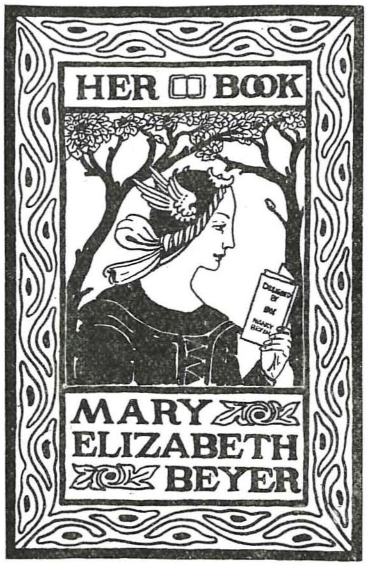
1.

2.



3.

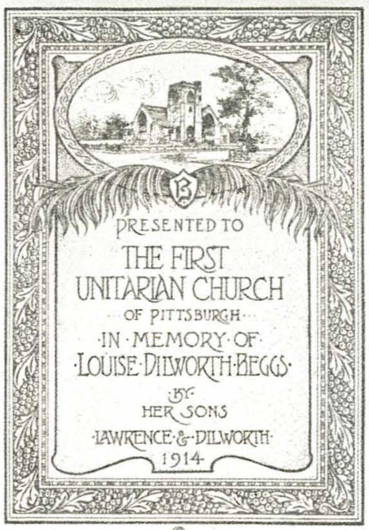
ILLUSTRATION NO. 3. Plates Designed by Pedro J. Lemos.



1. Nancy Beyer, Designer.

2.

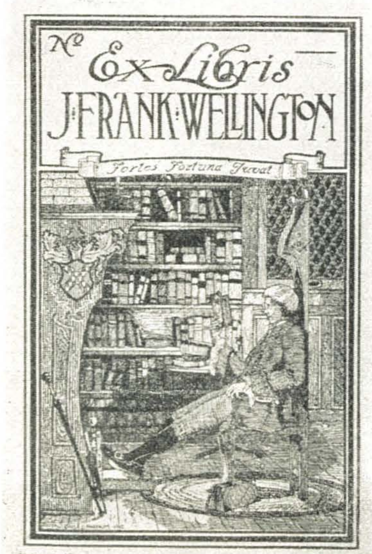
3. Nancy Beyer, Designer.



4. C. Valentine Kirby, Designer.

5. C. Valentine Kirby, Designer.

6. C. Valentine Kirby, Designer.



7. Royal B. Farnum, Designer.

8. Royal B. Farnum, Designer.

9. Royal B. Farnum, Designer.

ILLUSTRATION NO. 2.

modern plates has been as marked as upon the style of clothes or the decoration of china. This has given them a historical value so that the old plates are classified by C. D. Allen in "American Book Plates" as follows: 1. Early Armorial. 2. The Jacobean Style—shield left plain, used on decorated background. 3. The Chippendale Style—shell work surrounded by a shield—floral accessories. 4. Plain shield surmounted by a crest, base of shield encircled by palms. 5. The Allegorical Style—illustrated by a figurative design. 6. The Landscape Style. 7. The Seascape Style. 8. The Literary Style—use of books and library interiors. 9. Portrait Plates. 10. Name Labels. There might be added to the list the Purely Modern.

Many of the above styles of decoration as used on book plates are atrocious, but one can say of the modern style the principal aim is not the following of the style so much as the aim of the trained artist to make a thing of beauty out of the design.

There are 28 or 30 methods of reproduction. The cheapest and commonest method of all is the zinc line etching. The highest in value is the engraved plate. The new process of leather incising as discovered and developed by Pedro Lemos is shown in the first two book plates, illustration No. 3. This is noted as a process suitable for experimentation in art schools and schoolrooms. It has proven a practical method and has great scope for variation of tones.

The medium used in working out a design is of interest inasmuch as the effect of the design depends somewhat on the mediums used. There is great scope for variety and beauty in a design drawn with charcoal and ink as the second plate, illustration No. 1. The modeled book plate, the middle one in the second row of illustration No. 2, is rare—few book plates have been modeled. This one, no doubt, will be greatly valued by collectors. It is also to be noted as a joint book plate.

The important elements in the making of a book plate, as they range in significance, are: the name of owner, beauty and technic, elements of interest, designer, date, method of reproduction. Comparing No. 2 with No. 7, it is seen that the element of ownership stands out in the latter but fails in the former, the third element predominating. Try the test on others by comparison.

DRAWING IN CLAY

Mrs. C. F. Niles, Menomonie, Wis.

THE following problems were given as a series of lessons at the Stout Institute, clay being the medium used in drawing:

Circular Problems.

Problem One.

Example 1—A Ball. (Illustration, Plate 1, No. 1.)

Take a piece of clay, and model in the hands until a perfect ball is formed. This is done by smoothing with the fingers, and not by rolling in the palms of the hands.

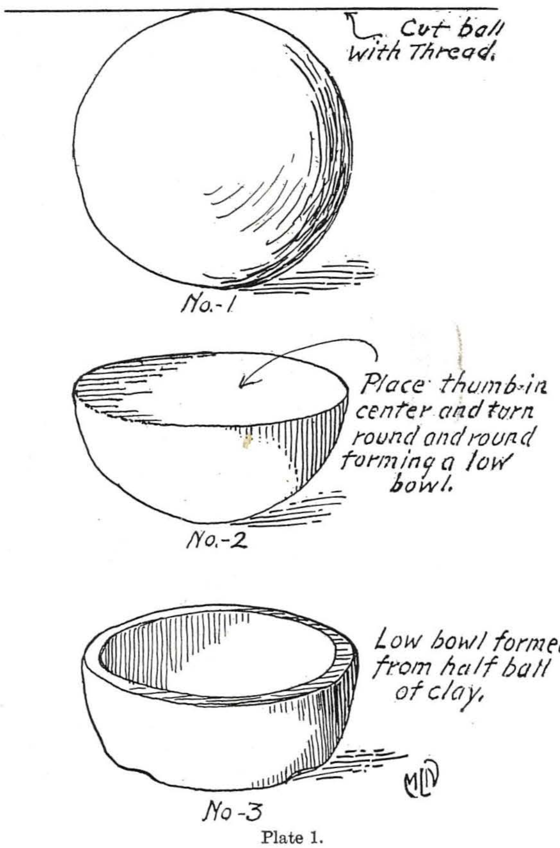


Plate 1.

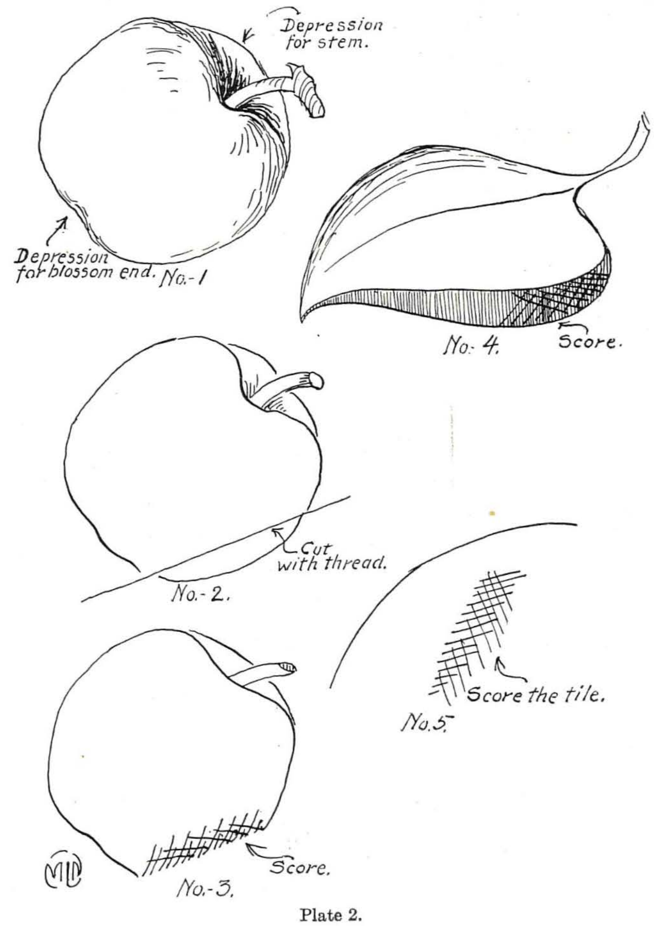


Plate 2.

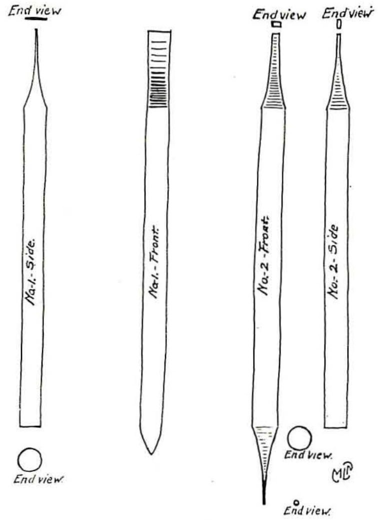


Plate 3. Skewers.

Example 2—A Half Ball. (Illustration, Plate 1, No. 2.)

With a piece of thread or wire, held taut between the fingers, cut the ball in two equal pieces.

Take one of the pieces in the palm of the left hand, and press the thumb of the right hand into the center of the cut surface (Plate 1, No. 2), turning round and

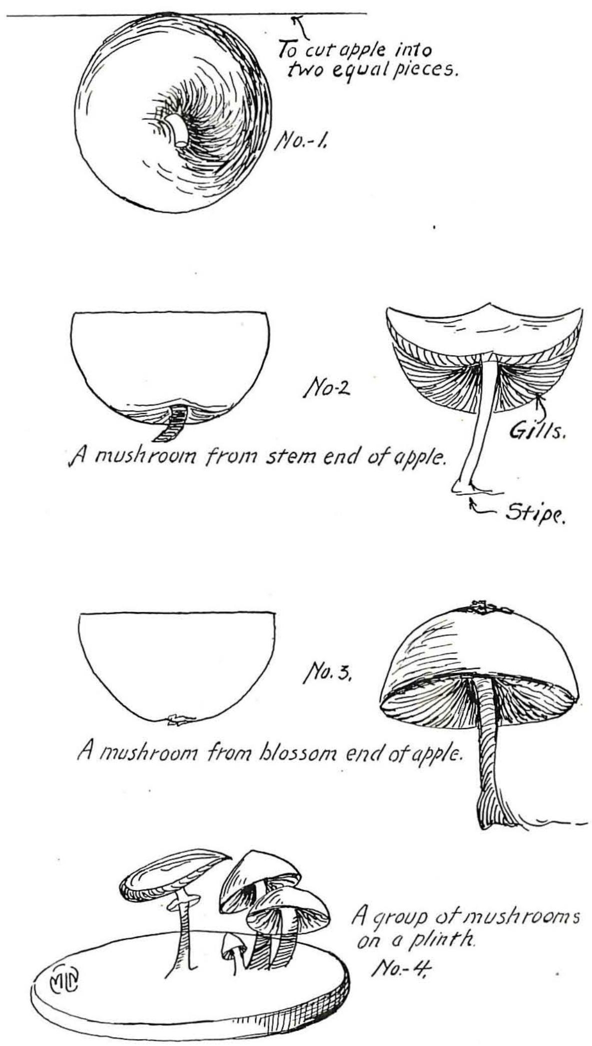


Plate 4.

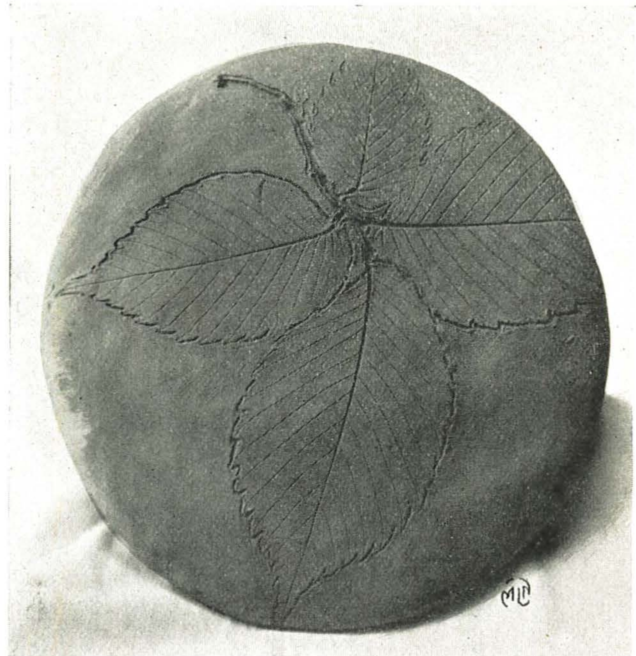


Plate 5.

round, forming a bowl (Plate 1, No. 3 and Plate 9, No. 2). Other bowls of varying shapes may follow. Low bowls with handles, or covers, may be made, or other circular dishes.

Problem Two.

Example 1—An Apple. (Illustration, Plate 9, No. 3.)

Form another ball of clay; make a depression with the thumb on two opposite points, for the stem and blossom ends of an apple. (Plate 2, No. 1.)

Roll a little strip of clay for the stem, and fasten it into one depression. This may be done by taking a pointed skewer (Plate 3) and making a hole, into which fasten the stem. In the opposite depression, mark with a skewer the sepal fragments of the blossom.

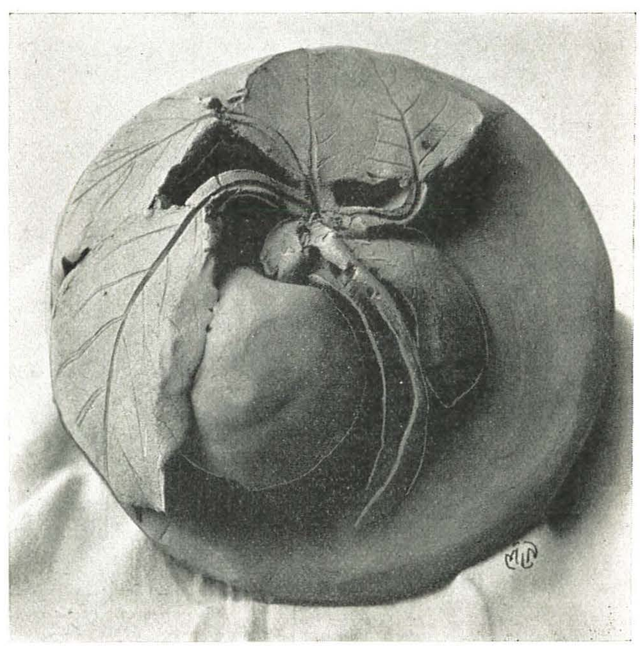


Plate 6.

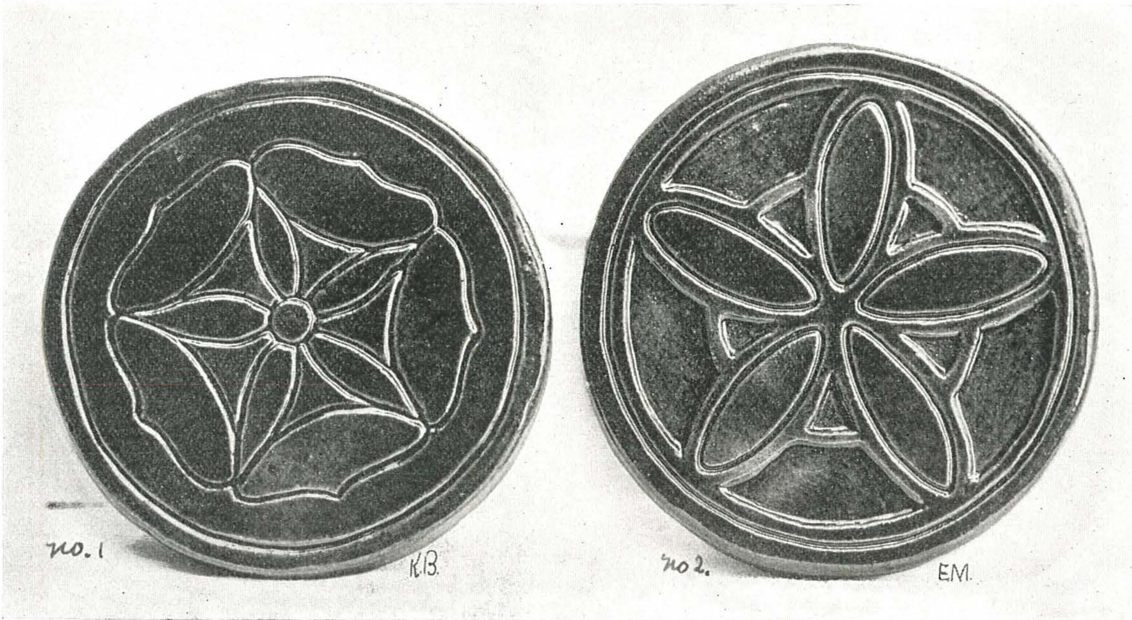


PLATE 7

The class should be furnished with apples as models, and the general character of the apple studied. Other and various fruit forms may follow, to illustrate spherical problems.

Example 2. Make another apple, and with a thread cut at right angles to the stem (Plate 4, No. 1), dividing the apple in two equal parts. With the stem half the apple, make a mushroom. (Illustration, Plate 4, No. 2.) Study mushrooms and their varying shapes.

With a skewer, mark the gills of the mushroom; add a little clay to the stem of the apple, to increase the size of the stipe of the mushroom. With the other half of the apple, form another mushroom (Plate 4, No. 3 and Plate 9, No. 1). Attach this to a plinth—several smaller mushrooms, in various stages of development, may be added to the plinth, to form a pleasing group and good space relation (Plate 4, No. 4).

Problem Three.

Example 1—Apple and Leaves. (Illustration, Plate 6.)

To make a circular tile (Part 1, Problem 3) draw with a pencil, on manila paper, a circle five inches in diameter. Within this circle, fill bits of clay, pressing them firmly together, until an even thickness of three-eighths of an inch has been formed. Turn the tile over, remove the paper and fill all the cracks, smoothing to a good finish, with the fingers. Lay this aside.

(*Part 2, Problem 3.*) To make a leaf impression, smooth out a piece of clay, one-fourth inch thick, five by five inches square. Take a spray of apple leaves, arrange

Plate 8.

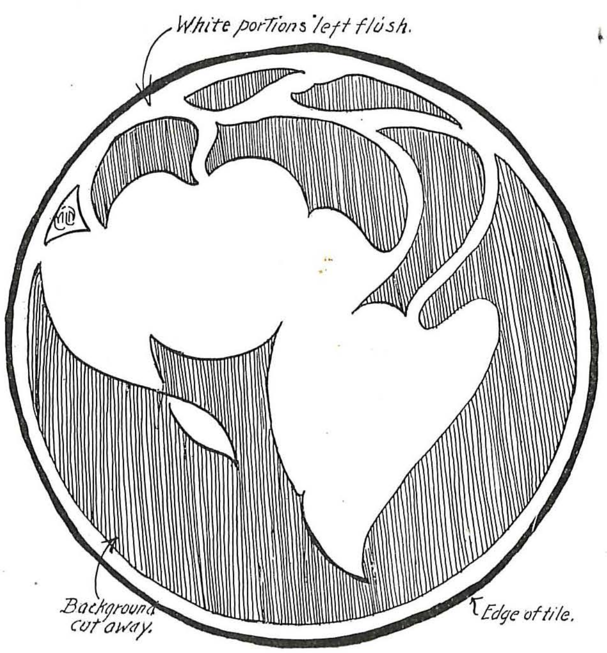


Plate 10.

under side down on the thin piece of clay. Over this place a thin piece of cloth, press firmly, smoothing from the center out.

Remove the cloth and with a sharp skewer, cut around the margins of the leaves.

Remove the apple leaves carefully and you will have a reproduction of the veining of the leaves. Plate 5 is a leaf impression of the elm leaves, but illustrates the problem.

Lift these leaves carefully, and arrange them upon the circular tile (Part 1 of Problem 3). Lifting one side of each leaf with the skewer, firmly attach the other side to the tile.

Great care should be taken not to efface the veining of the leaves. The reason for attaching only one side of the leaf is, that in drying, it would shrink and pull away from the tile. The method of fastening the leaf to the tile is to score both leaf and tile, then press them firmly together. (Plate 2, Nos. 4 and 5.)

Model an apple as before directed, and place among the leaves on the tile. A small portion of the apple must be cut away (Plate 2, No. 2) so that the apple will fit more closely to the tile.

Score apple and tile deeply and fasten well together. (Plate 2, No. 3.) Arrange for good design and well balanced space relation.

Problem Four.

Example 1.—A Circular Tea Tile. (Illustration, Plate 7.)

A cross section of the apple, held up to the light, shows the outline of an apple blossom. This is to be used as a subject for the design of the tea tile.

Make a circular tile, one-half inch thick and five inches in diameter, as before directed.

Lay aside for a day to partially dry. On tracing paper, make a tracing of the above design; place this over the tile, and with a lead pencil, go over all the lines of the design. Great care should be taken not to cut thru the paper. Remove the paper, and the design will show distinctly on the tile.

The problem of the circular tile may be carried out:

1. A simple incised line design (Plate 7, No. 1).
2. Low relief, the background being cut away, (Plate 7, No. 2, and Plate 10.)
3. In high or low relief, the design being built up, piece by piece (Plate 8), which is a design from the thorn-apple, but illustrates the problem.

Methods—Use of the Skewer. (Illustration, Plate 3.)

1. To incise a line, hold the skewer vertically.

Use skewer No. 2, front side, with the line; cut one-sixteenth of an inch deep, and the width of the skewer point (one-sixteenth of an inch), cut slowly and evenly, finish with the thumb, following the lines, until a smooth surface has been gained. If the clay is leather hard, the lines will not crumble while working.

2. To cut away the background of a design, incise all lines of the designs, then take skewer No. 1 held vertically, begin cutting away the clay.

Cut with the broad side of the skewer, from the incised line toward the background space (Plate 7, No. 2).

Cut one-sixteenth of an inch deep, finish as before stated. The thumb is the clayworker's indispensable tool. Plate 10 should be executed by this method.

3. In high or low relief, the design being built up piece by piece, incise all lines in the design by use of a small coil of clay about one-fourth of an inch in diameter. Outline the design. Fasten this coil of clay firmly into the incised lines.

Fill in the design to the required thickness, which should be about three-sixteenths of an inch. Finish to a fine surface (Plate 8).

Tiles finished by any of the above methods may be glazed and fired, and used on the table.

Application.

1. A Ball (Plate 1, No. 1).
2. An Apple (Plate 9, No. 3).
3. A Decorative Tile (Plate 6, Plate 10).
4. A Circular Tea Tile (Plate 5, Plate 7).

PLATE 9.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

WHAT AND HOW.

OCCASIONALLY one hears, even now, some such expression as this: "It isn't so important *what* we study as *how* we study it." We should come not far from the truth to say that the whole movement in modern education for the last 25 years has been away from this doctrine of formal discipline. If such a statement were true that it is not of the greatest importance what we study, much of the talk of industrial education and vocational guidance would be foredoomed to come to naught, for these aims are based on the proposition that it makes all the difference in the world *what* we study.

A generation ago, children were required to memorize names of railway stations in their order, to string together a long list of historical dates, to sing the names of the various states with their capitals in geography, and to do various and sundry other things of similar import. The claim was that such routine "strengthened the mind"—that the importance lay in the method and the drill. While there is no denying and no disposition to deny the value of proper method and drill, it must be maintained that the subject matter is of vital importance, or should be.

It is hardly worthy a good teacher to impose a lot of meaningless routine upon boys and girls on the plea that "it doesn't matter so much *what* they study." The better way would seem to be to provide as meaningful, interesting, and practical material as possible, and then to require as rigorous method and drill as desired in the handling of this richer material. In so doing, there need be no conflict between these two phases—they are indeed both necessary to the proper accomplishment of good work. If we aim at discipline, would it not be just as safe and as effective to get it from material that is full of significance and interest, and that touches the vital problems of life?

So, let us emphasize this: It *does* make a *mighty* difference *what* we study as well as *how* we study it.

NO SMALL JOB.

IN a recent interview a prominent state superintendent of schools congratulated the editors of THE INDUSTRIAL-ARTS MAGAZINE on their opportunity for service in adjusting industrial training to school conditions, and stated that in his opinion emphasis on this adjustment would be necessary *for a time*.

Other educational prophets have surmised that *for a time* Industrial education would be a live topic. One pessimistic educator has expressed a fear that a publication devoted to such a *narrow field* would soon *run out of material*.

In contrast to these views that the Industrial Arts are a relatively small part of desirable school instruction and are liable to adjustment in time, we are convinced that the problem grows on investigation and defies perfect adjustment for all time.

The experiences of the organized forces for the promotion of industrial education during the past year have pointed to the conclusion that the subject is so vital and so extensive that ideal adjustment may not be expected short of the millennium. Like Murphy's turnip, the subject just grows and grows in size and possibilities.

Realizing the hopelessness of teaching that which has not come out of the experience of the race we are beginning to realize the enormous problem of teaching all that has come out of such experience.

The example of a single industry signifies the scope of industrial training. Agriculture is half a century old as a school subject in the United States. It has developed rapidly in the past ten years only after a content of the subject has been formulated and adapted to school instruction. This formulation and adaptation cannot remain fixed.

We hope that industrial teaching may catch up and keep up with race experience but we have no fear of settling the matter off hand and running out of material.

MANUAL TRAINING AND PREVOCATIONAL WORK.

IN the "Findings About Education for Occupations" in the various industries, in the Report of the Richmond Survey, we find that without exception the worker needs general education equivalent to the completion of the eighth grade, and with only one exception, one or two years of prevocational work. Under the heading of "manipulative skill" which is needed by the worker we find "dexterity in handling a great variety of tools," "dexterity in the laying out of work and erecting," and expressions of like character. Under the head of "other requirements," we find mental alertness, initiative, accuracy, patience, keenness of sight, adaptability, steadiness of head, carefulness, high degree of manipulative skill, artistic sense, color sense, etc.

These statements as to what is needed by the worker in the industries were prepared after a careful consideration of schedules made by 509 workmen in the various industries investigated. It is quite likely that the men who made these schedules never heard, and surely never used, the term *prevocational,* and we will venture to guess that the term which they used is *manual training.*

Every good course in Manual Training which has been offered in modern schools has had for its aim the provision of those qualities which are enumerated as "other requirements" in the findings regarding education. To be sure many courses in Manual Training have fallen far short of their aim or the aims of those inaugurating such courses, but on the other hand, we believe that in a majority of cases the fault has been in the remainder of the course of the elementary school, in that

it did not have any direct relation to everyday activities of life. Consequently the children have left school without receiving the benefits of the manual training which is offered in the seventh and eighth grades.

The children who have received the manual training instruction have been benefitted, but of course, those who dropped out of school before reaching the higher grades of the grammar school have not been benefitted by the Manual Training, any more than they have been benefitted by the trade schools or the high schools or the colleges, because they have never had the opportunity of receiving the instruction. In providing prevocational courses, it must be remembered that these courses will not be effective unless some provision is made for the children to reach the grades in which this work is offered.

SURVEY GARY?

WITHIN the last three or four years, a number of school systems in various states have been reorganized on the socalled Gary plan. On close inspection it is found that these reorganized schools are quite unlike in many important aspects. It seems that the Gary plan means many things to many men. To some it appears that the Gary schools are satisfactorily solving all of the difficult problems of public education. To others it is quite incomprehensible, while many are quite skeptical concerning the reported results in reduced cost, larger attendance, increased efficiency of instruction, the prevention of elimination and retardation, etc., even in Gary.

If it be true that the schools of Gary are operated at a much less per capita cost than other schools, and if with the lower cost, the schools are giving efficient vocational training, have better equipment with large playgrounds, gymnasiums, swimming pools, etc., the Gary methods should be fully explained, and immediately adopted by other cities.

If on the other hand, the schools of Gary are not producing the results that are claimed for them, this fact should be made public, as it is unfair to have the actual results of other schools compared with the reported results of the Gary schools. Many superintendents are being criticised by their school boards for not adopting the Gary plan to produce the results claimed for the Gary schools.

It would be a great contribution to the cause of education if some authoritative institution such as the Division of Education of the Russell Sage Foundation should make an extensive and complete survey of the Gary schools, applying the same standards of measurement to the Gary schools which have been applied to Springfield, Richmond, and various other cities. It is unfair that Gary schools should be judged by the standards of magazine writers, presidents of school boards, and mayors of cities, who visit Gary for a day, while other school systems are judged by educational experts who remain in the schools for five or six weeks applying accurate tests which are not affected by exhibits or other tricks of the experienced schoolman. It is also unfair to have Gary schools judged by schoolmen who visit Gary for a few hours, and because they do not wish to change their own methods, circulate untrue reports concerning what they have seen.

The school authorities of Gary seem quite willing to have others profit by their experience, but the number of visitors has become so great that it has been found necessary to refuse admittance to visitors except at certain stated intervals. At these times, Superintendent Wirt devotes his entire time to explaining the plan of his schools to visitors.

The report of a complete and comprehensive survey of the schools would thus be valuable not only to the Gary authorities but to those who now feel it necessary to make a trip to Gary, and to others who find it impossible to visit the schools at the times designated for visitors. By all means let us have a survey of the Gary schools.

THE ILLINOIS SITUATION.

INTEREST in laws for the promotion of Vocational Education are just now largely centered upon the situation in Illinois. Two different types of laws will probably be proposed at the session of the Legislature. The State Teachers' Association has a special committee and a paid investigator who is devoting his entire time to collecting statistics and opinions regarding the best type of law. It is understood that Mr. E. G. Cooley will be the author of a bill providing for "dual control" of the schools, the duality in this case to be strongly emphasized. This bill will be backed by a number of commercial organizations. The State Teachers' Association and several educational organizations of Chicago will strongly oppose the dual system. To any one who enjoys a good "scrap" the situation appears quite promising.

The question has been so thoroly and repeatedly debated that it requires little comment. The situation in this case, however, seems to be such that no agreement between the two factions is probable. In this case any law which is passed will not be so successful as tho both factions were united. It would seem that some compromise might be reached. Those wishing the dual control seek to bring the best thought and opinion of the laborer and the manufacturer to bear on the problem, while those demanding unit control seek to maintain the unity of the school system. Both of these results might be attained by providing that the responsibility and control of the vocational schools should be in the hands of a board appointed by the Board of Education, but that the acts of the vocational or industrial school board should be subject to the approval of the Board of Education.

"The art training which belongs in the elementary school is that training which makes for a better appreciation of aesthetic standards and which finds expression in making things more pleasing than they otherwise would be."—*Dean James E. Russell, Teachers College.*

To believe rigidly in cause and effect is to be a philosopher. To act rigidly upon the belief is to be an artist.—*C. Hanford Henderson.*

HOW IT WAS DONE!

The purpose of this Department is to present monthly a wide variety of shop projects which have been actually worked out in elementary, high, trade and continuation schools. Contributions are solicited and will be paid for—THE EDITORS.

A HAND WROUGHT KNOCKER.

Arthur Kinkade, Decatur, Illinois.

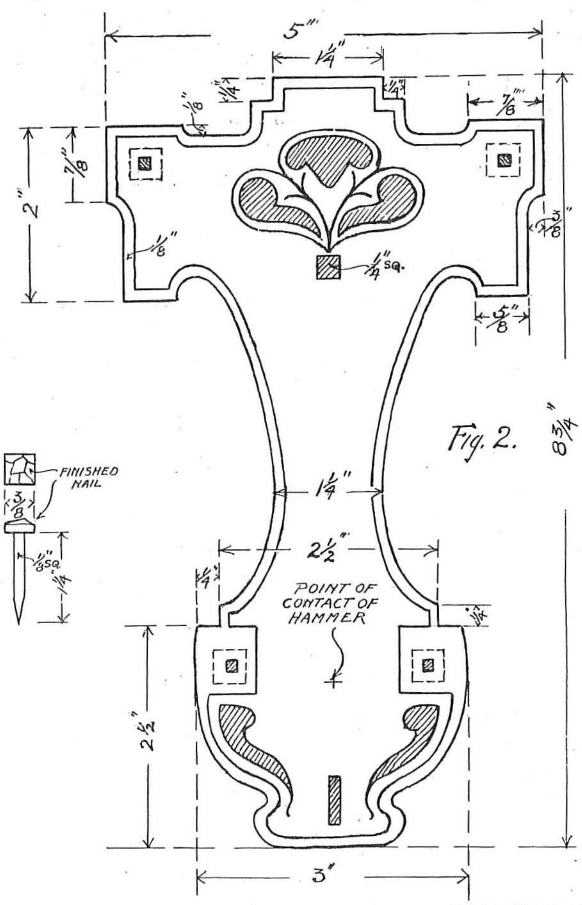
THE photograph represents one of the things I succeeded in making during the past Summer Session at Stout Institute. The design was worked up by someone, unknown to me, in the design class of Maurice I. Flagg. The request to make it came to me thru Mr. Thomas Googerty, and today the product occupies the position of honor on the front door of one of Menomonie's prettiest homes.

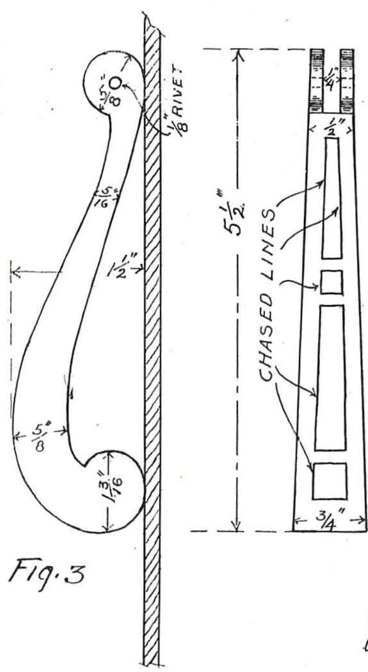
The first step in the making of this door knocker is to lay out the design (Fig. 2) on a sheet of 12-gauge soft steel. A sharpened slate pencil is best for this and similar work. The outline should then be carefully traced with a small cold chisel or prick-punch to make unnecessary any further trouble about the boundary lines. Using a heavy cold chisel and sledge hammer, the plate is cut out of the large sheet of steel, leaving about one-eighth of an inch margin all around the edges. The plate is then carefully hammered flat on the anvil, after which a medium half-bastard file should be used to smooth up the edges and bring the piece down to net size. The edges should not be filed square. A much more pleasing result is secured if a slight bevel is formed around the entire piece, and in the perforated openings as well. After the edges are nicely trued up, the perforations are made by first drilling small holes inside the enclosed spaces and cutting away the burrs with a small cold chisel. Patience will be needed to file out the openings in pleasing lines, but the result is worth the effort. The shaded parts of the sketch (Fig. 2) are to be cut out, as are also the four one-eighth inch holes for the nails, and the quarter-inch hole for the lug. The chasing line is then run as shown in the detail drawing. The proper method of doing this very important part of the work is explained fully in the November issue by Mr. Googerty, in his article on Art Smithing.

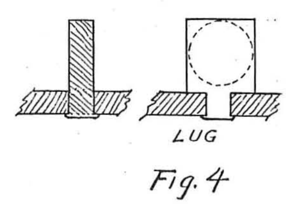
The foliated perforations at the top of the plate should be heated and raised in relief on the elm-block by using a round-nosed punch and light hammer. The offsets at the lower nail-heads are accentuated by depressing the metal while hot with a square edged punch.

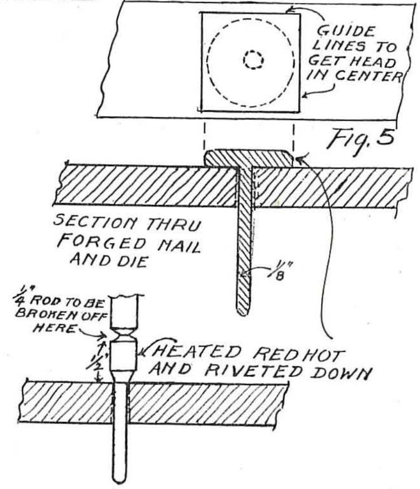
The "hammer" is next taken up, and is forged from soft steel into the shape shown in Figure 3. This work will have to be done largely by eye, altho the general sizes given must be followed rather closely, especially with reference to the distance between the hinge-end, and the point of contact on the plate. A lug is filed out as indicated in Figure 4; the shank of which will just slip thru the square hole in the top of the knocker plate. When the surfaces of the broad end are filed to a uniform thickness of about three-sixteenths of an inch, the lug is heated on the small end to a live red and is riveted into place with light blows from a small hammer.

The projecting leaf on the front is now to become the tongue of a hinge, and a slot is filed in the hinge end of the hammer that will just receive this leaf without too much play. The hole thru the hammer should be carefully located and bored just before the slot is filed, and









DETAILS OF DOOR KNOCKER.

the corresponding hole thru the leaf or tongue is located very easily after a good fit is assured. The hinge pin should be about one-eighth inch in diameter and is riveted cold. The leaf, or tongue, is filed to shape after the hinge pin is in place. Prior to this time it should be left square on the corners.

The square-headed nails with which the knocker is fastened to the door are forged as follows: (Fig. 5.) A small bar of scrap steel about three-eighths of an inch by three-fourths of an inch is bored at one end with an eighth-inch hole, which is then slightly tapered thru the use of a small round taper punch. This improvised die is placed, with the smallest opening up, just over the square hardie-hole in the anvil. A quarter-inch bar of round iron is drawn out to the desired diameter (about one-eighth of an inch) for a distance of about one-and-a-quarter inches, which diameter will freely slip thru the forming-die, hereinbefore described. From the point of contact with the die, about one-half inch is measured and the quarter-inch rod heated and scored all around on the hardie—but not cut entirely off. It will be seen that no tongs are needed for this work, and this fact helps considerably. The almost severed bit of iron is now returned to the forge and heated quite hot. As soon as the tapered point has been inserted in the die, the bar is broken off on the scored lines and the nail-head formed with quick blows from a light hammer. The danger of getting the nail-head lop-sided may be entirely overcome by cutting a small square on the surface of the die that will be slightly larger than the nail-head, and in the exact center of which the eighth-inch hole lies. After cooling, these forged nails are filed into any desired shape at the bench, in this case the body of the nails were made square, to fit into the square holes in the plate, in order to prevent twisting while being driven. The heads were filed square, in plan, but the tops were filed to resemble rough hammer marks.

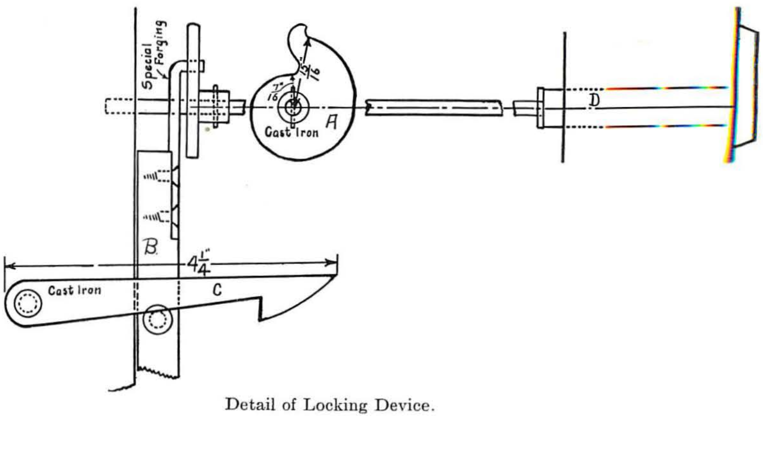
An excellent finish for all work of this character is had by heating the whole ensembled piece to a dull red and plunging it into water. Just before it becomes entirely cool, rub with a piece of waste, saturated in machine oil or linseed oil. A dull blue-black lustre will remain almost indefinitely.

Door Knocker.

LOCKING DEVICE FOR CABINET.

IN planning for drawers in which to keep the individual instruments of the pupils in the drawing classes, it was found necessary to provide for eight classes of 24 pupils—192 drawers. To provide for the locking of the drawers, the large case was planned in such a way that the drawers for one class were in two upright rows, twelve in a row. The accompanying drawings give the details of the scheme whereby 24 drawers were locked or unlocked simultaneously by the turning of one key.

In designing the device, it was found necessary to lift the catches which hold the drawers in place, one-half inch. A cam was designed which lifts the catch that distance in a little less than a complete revolution of the cam. This makes it impossible to remove the key from the lock without dropping the catches. A pattern of the cam was made in the school and several castings of the cam (A) and the hook (C) were ordered from the foundry. Eight cylinders or "barrels" of Yale locks (D) were purchased and long rods inserted in place of the short ones furnished with the cylinders. The cams were mounted on the rods and "set" at the proper place.



Detail of Locking Device.

When a class comes into the room, the instructor unlocks all of the 24 drawers at one turn of the key. After every pupil has taken his drawer from the cabinet, the instructor removes his key from the lock which drops all of the catches into place. Each pupil can then replace his drawer, which cannot again be removed without releasing the catch.

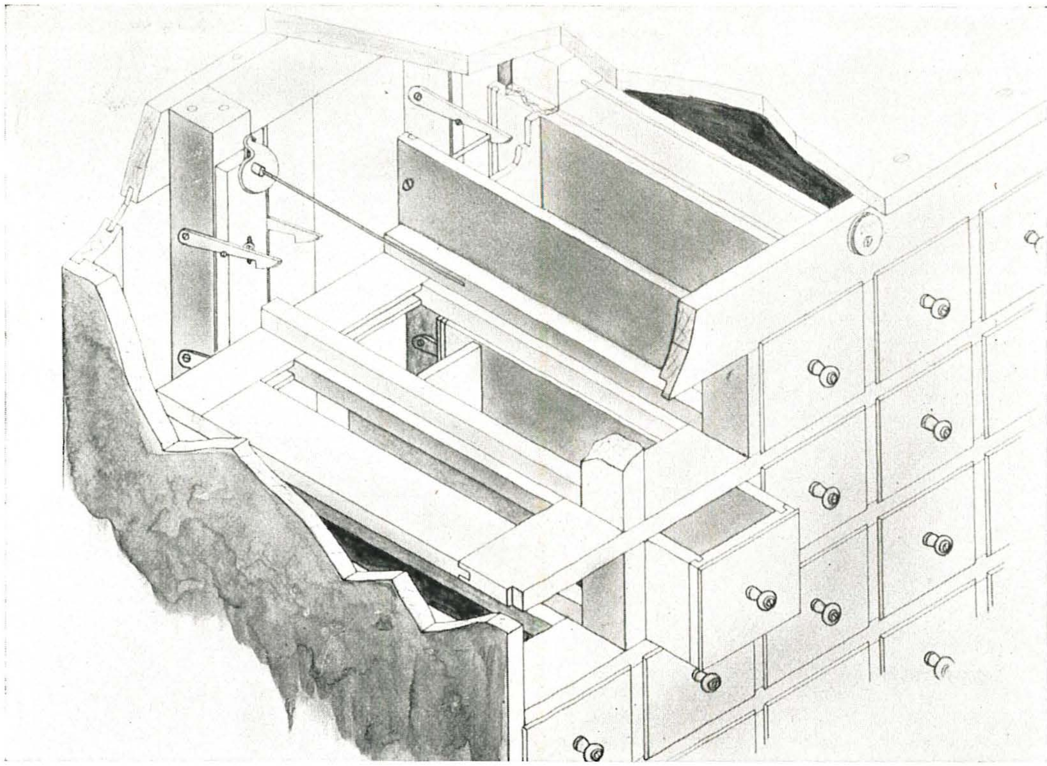
The device may be adapted to any cabinet requiring the locking of a large number of drawers. It was designed for use in the High School of Springfield, Ill., by W. M. Graham and W. H. Henderson.

PORTABLE ELECTRIC LAMP.

L. M. Roehl, Wauwatosa, Wis.

THE feature in this portable electric lamp which is particularly commendable is the tilting top which permits the light to be thrown where wanted.

After working all pieces to dimensions the upright pieces at the ends are fastened to the bottom pieces and the two cross pieces to the end uprights by means of mortise and tenon joints. The vertical members between the two horizontal pieces may be mortised; however they may

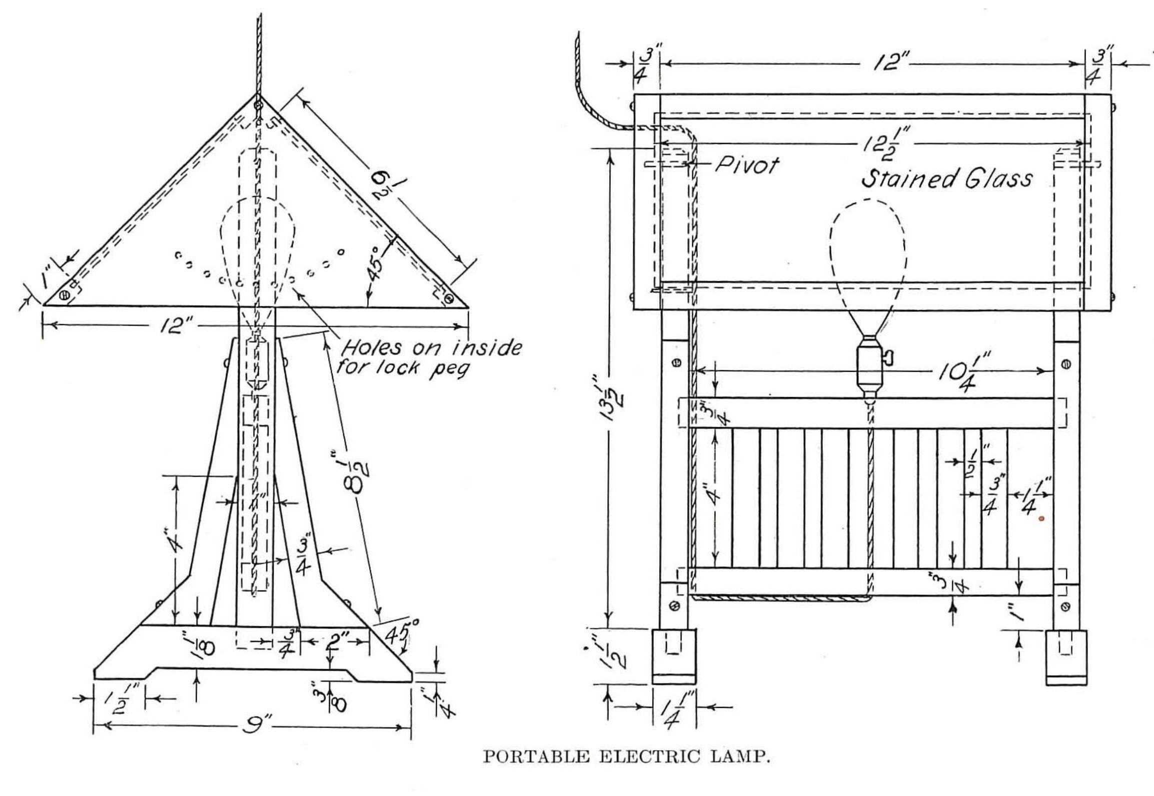


LOCKING DEVICE.

be held firmly in place by driving a flat head bright screw thru the bottom piece into each vertical member and two one inch brads into each from the top.

The braces at the sides of the uprights may be laid out by squaring the stock so that one edge and one end make a perfect right angle, then drawing a line across the edge four inches from the end and a line across the end $\frac{3}{4}$ inch from the edge, and connecting the two lines by lines across the sides. Three-quarters of an inch from line just drawn, draw a line parallel to line. Place stock in position and extend the 45 degree line at end of base to meet line on side of brace.

The groove in the ends, ridge and edges of the shade should be at least $\frac{1}{4}$ inch deep and wide enough for the



PORTABLE ELECTRIC LAMP.

glass to be inserted freely. The ridge and edge pieces may be run over a dado or rip saw and the groove in the end cut with a wide chisel for cutting to depth and a $\frac{1}{8}$ inch chisel for removing the stock.

The parts are assembled by using round head blued screws excepting the mortise and tenon joints which should be glued. A piece of $\frac{1}{4}$ inch doweling may be used as a pivot for the top to swing on. It should be placed in the end piece at a depth of at least $\frac{1}{4}$ inch.

To locate the holes for the lock peg, swing an arc on the inside of the end of the shade with a $3\frac{1}{2}$ inch radius using the pivot as a center.

One-quarter inch holes are bored thru the end of the shade and horizontal pieces for the cord. The lamp is held in place by being fitted firmly in a little pocket on the upper horizontal member.

Principles of Salesmanship Training.

"The underlying principles of salesmanship training may be expressed as follows: That the education and betterment of the working girl in department stores are of vital interest to the public, the employer, and the girl herself.

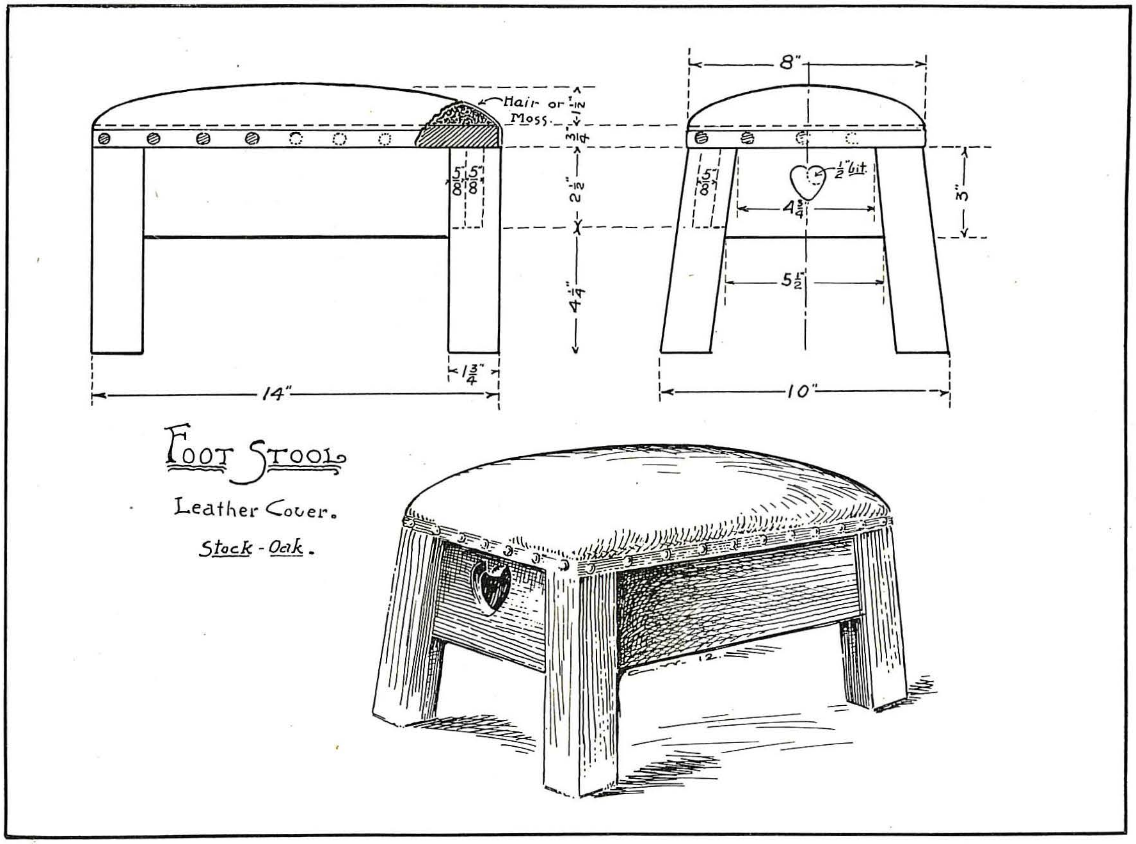
"The problem is sociological as well as economic, and economic as well as sociological. Both factors must be considered; both the social status and the economic status of all parties concerned must receive the proper consideration.

"The working girl must have not only an active part in the organization and operation of the plan, but also a share in the economic gains to be derived thru an increase of her efficiency.

"One of the widest fields of employment for the young girls of our cities is to be found in the *department stores,* yet because of certain defects in management this work is far from being a satisfactory vocation for women. Entrance to the store is easy. The requirements for minor positions are so simple that they may be filled by any one having the rudiments of a common school education and are often filled by girls from the sixth or seventh grammar grade with no special preparation of any kind. Advancement from these positions should be based on increased efficiency, but the stores have no systematic methods of training their employees and no reliable basis on which efficiency may be determined. Advancement is more or less by chance or favor, and while those of superior intelligence and force may rise to positions of importance, the average worker seems to be satisfied with mediocrity.

"Many store managers have realized that the human element in their organization was receiving far less attention than their mechanical equipment and have tried all sorts of plans for betterment. Some establishments have elaborate and costly arrangements for the health and comfort of their employees, with social secretaries, physicians and nurses to make these arrangements effective."

Miner Chipman, Efficiency Counsellor for Department store Managers, Cambridge, Mass.



A color of stain should be used for finishing the wood which will harmonize well with whatever color of stained glass is used in the shade.

FOOT STOOL.

Clark Woodward, Head Manual Arts, Tenn. State Normal, Murfreesboro, Tenn.

DESIGNS for Foot Stools are limitless. We fashioned this one to follow up exercises in plain right angle mortise-and-tenon joints so that the worker might exercise himself in more difficult angles and at the same time begin to learn a little about the first steps in upholstery by padding the top.

The frame is covered with a three-fourths inch board having the upper corners rounded considerably with the wood rasp to prevent wear. This board should not be the full size of the frame but should be about three-sixteenths inch less on all sides so that the edges will work out flush when all the material has been put on. The padding material may be a tough quality of excelsior and cotton, or hair, or moss. The low mound is shaped mainly by drawing down the mass with the first covering of cheap strong cloth. Use the best quality of leather—very little is required—or in its absence, a good grade of velveteen, if it can be found in subdued colors. Leather tape and a few upholsterers' nails will add greatly to the finishing.

BRIEF ITEMS OF INTEREST

RECOMMEND ADDITIONS TO LAWS.

THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION is urging the passage of the following additions to the Vocational Education Laws of Indiana, New Jersey, and Pennsylvania:

SECTION 1. Any school city, town or township may establish and maintain general evening continuation schools or classes enlarging the general civic or vocational intelligence of persons over 16 years of age. Such schools or classes shall, as long as they are approved by the State Board of Education, be reimbursed for expenditures in the same manner and to the same extent as is provided for the vocational schools and departments of the State under an Act entitled "An Act to provide for the encouragement, maintenance and supervision of vocational education, etc."

SEC. 2. School cities having a population of more than 5,000 according to the last preceding United States Census may, and after September 1, 1920, shall establish and maintain compulsory general or continuation vocational schools or classes. Attendance upon such schools or classes shall be obligatory upon all children between fourteen and sixteen years of age who are regularly and legally employed, for not less than five hours per week between the hours of 8 A. M. and 5 P. M. during the school term. Attendance upon such schools or classes shall be enforced in the same manner by which the school attendance of children under 14 years of age is enforced. Such schools or classes shall as long as they are approved by the State Board of Education be reimbursed for expenditures in the same manner and to the same extent as is provided for the vocational schools and departments of the State under an Act entitled, etc.

SEC. 3. The State Board of Education may cooperate with school districts, and with the educational institutions of the State in the training of teachers for continuation and vocational schools, departments and classes.

ORGANIZATION IN THE WOOD-SHOP.

By George M. Hargrave, Instructor in Woodwork and Ironwork, Walsh County Agricultural and Training School, Park River, N. D.

(Abstract of an address before North Dakota Education Association, Manual Arts Section.)

THE first factor in successful organization is the teacher himself. It is needless to say that he must have ability. The teacher's knowledge must be his own; he must have the image of things in his mind and muscles. If he has to go to books, papers and the like for all his material, he had best pursue some other profession. He must also obtain a working knowledge of the individuals in his class.

It is not enough for the teacher to know woodwork and to know his pupils; he must clearly plan how to bring these two sets of ideas into relationship. This is the pedagogical side of organization. The first essential is to know the purpose of the woodworking course. The fundamental principle of some teachers seems to be to make a good showing on exhibit day. The aims and methods of these men make manual training a farce and a fad. The boys in their classes make fancy furniture but have practically nothing which will give them skill for earning a living.

The teacher's first step in successful organization must be a real purpose for his course in woodworking. The teacher must not plan too concretely in advance, lest he sacrifice the needs of the individual students to the subject matter. Some teachers, at the beginning of the year, set before their classes a number of drawings of projects and explain that all of these must be done before the pupils can receive a credit. This is another false standard of credit getting and discourages real interest in manual training.

In work so concrete as manual training there is a great opportunity for organizing the students so that the workshop becomes a little community where each student may feel himself part of a whole, where he is no longer working by himself but where all he does affects the rest of the class. In planning an organization of students, no set rules can be given. Local conditions, environment, temperament, etc., must be considered. The test must be: Does it work? Will it be the most efficient method of teaching the class? Will it create interest and enthusiasm?

The writer has found his classes enjoy the work more and gain practical knowledge when they are required to make things not only for themselves but for the school and the community. A toolroom built by the students, drawing tables, sewing tables, cloak racks and other articles made by the students interested them immensely and seemed to create a stronger tie between the school and the boys.

Anything which makes boys feel that they are part of a body of fellow-students who are a unit in doing something is bound to create interest and to make each feel that he is good for something. Class organization will greatly aid in leading students to a higher level of efficiency when they feel that each is working for the good he can get from the work.

Some details of the class organization can be arranged in some such way as the following: The class with the teacher's aid may elect a foreman. This will start the shop like a regular workshop. The foreman must be the ablest in the class and will, under the direction of the teacher, aid in seeing that the work is carried out.

For the regular class workings at individual pieces, I have found it a great aid to our organization to divide the shop into departments. The students alternate in charge of these, each one remaining in charge one week. This gives the boys a thoro knowledge of the workings of each phase of the work and will make clear to them why things are done a certain way.

The first department is the toolroom. Most of the tools are put in the toolroom with a "toolroom keeper" in charge. This boy is required to learn the names of all tools, to keep the tools cleaned, oiled and in good order. He must see that no tool is returned in a dirty or damaged condition. He must keep the toolroom in order, sweeping the floor at the close of the period. As each workman wants a tool, he applies for it to the toolroom keeper and hands in a check marked with his number. These checks are made of metal rimmed tags, stamped with a certain number for each pupil. The toolroom keeper hands out the tool to the applicant and hangs the check up in its place. Thus we can tell who is using the missing tool and in case of loss or breakage, we charge the user with the tool and take the amount out of his deposit money. The toolroom keeper is personally responsible for the proper return of all tools at the close of the period.

The second department in our organization is the lumber room. The lumberman's duties are to keep the racks of lumber neatly piled. He is to allow no one to waste any lumber, to assist in measuring and exactness. He is required to compute and hand to the instructor the

board feet and cost of every board taken from this room. This gives the lumberman an idea of the cost of lumber and gives him practice in figuring lumber. Each boy takes his turn at this department, as in the toolroom.

The third department is the finish room. The boy in charge must learn the proper way to apply all finish, glue, etc., and to keep the room in neat condition. He is expected to be ready to aid the teacher in assisting pupils in such tasks as the gluing up of large pieces, when speed is required. He is expected to keep the run of the stock of finishing material and report when anything is needed.

The question may arise: "What is there left for the teacher to do with such a complete organization as this?" This plan leaves him free for important things—helping the slow students, demonstrating, teaching, supervising the whole plan, without having to spend his time in routine.

I may sum up the purpose of organization in the wood-shop as follows: To secure from the class practical results, it is not necessary to eliminate furniture or cabinetmaking, but to systematically plan a course which will aid the pupil in his after life.

CO-OPERATIVE COURSES IN NEW YORK.

New York, N. Y. Beginning with the second term of school, vocational training for high school students has been provided with the opening of part-time co-operative classes on the "'Schneider" plan. The work is in charge of Mr. John H. Haaren, associate superintendent of vocational training in high schools.

To assist in the operation of the plan, co-ordinators were appointed in each of the several schools. Their duties will be to get in touch with merchants and manufacturers who are willing to enter into agreements with the board of education for the instruction of boys and girls in their respective lines of work. The co-ordinators are required to visit the offices and factories weekly to inspect the work of the students and to observe whether the agreements are being lived up to by the employers.

The boys will be subject to factory rules and to the regulations of the trade union, if the shop is a trade union shop. The working day is eight hours in length and the boys are paid at the rate of ten cents per hour for the first year, twelve the second and fifteen the third year. During the summer they may work in the shop after the schools close thus giving a month's vacation.

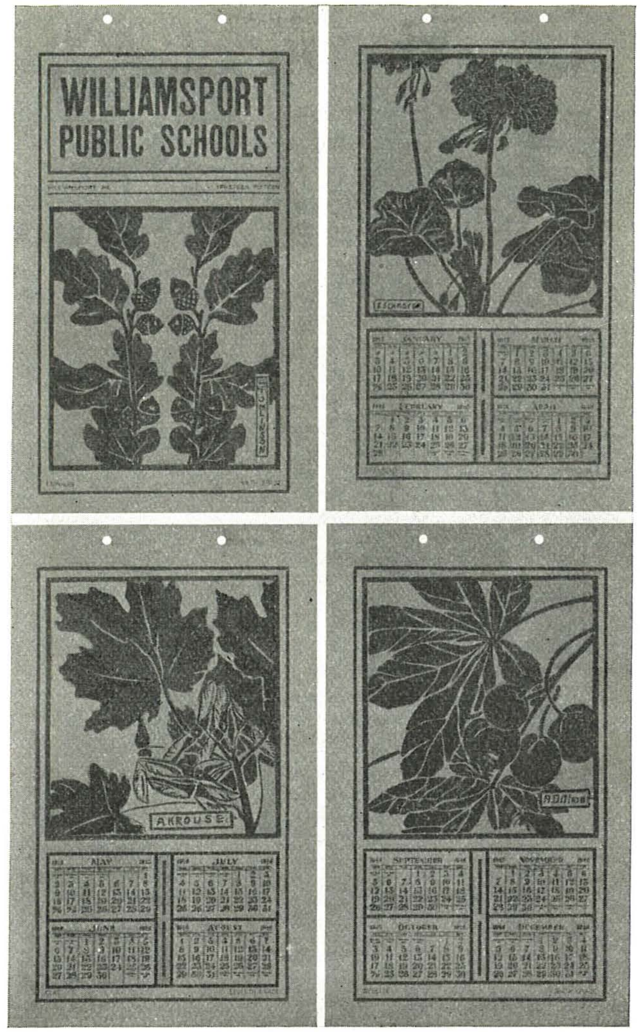
It is provided that boys who go into the factories must have spent at least a year in the high school. They must devote three years to shop work, the time being divided between school and shop in such a manner that each department of the trade may be learned thoroly.

INDUSTRIAL EDUCATION IN MAINE.

For the year ending July 1, 1914, there were 28 cities and towns that offered in their elementary schools courses in manual training. Seventeen conducted mechanic arts courses in their secondary schools. These figures represented a gain of 8 cities and towns offering elementary courses and 6 offering secondary courses. Thirty-three teachers of manual training were employed in the public schools in 1913-14 where 25 were employed in the preceding year.

Household arts courses were given for the year ending July 1st, 1914, in the elementary schools of 26 cities and towns against 21 for the preceding year, while 9 high schools representing an increase of 4 schools offered courses in household arts. These figures reflect the results of the encouraging legislation of 1911 that was enacted with a view to increasing the attention paid in the public schools to the practical arts.

The total expense to the towns and State of these practical arts courses in the public schools was $42,794. This expense amounting to less than 1 per cent of the cost of maintaining public, common and secondary education should allay the fears of those who believe that the school courses are too seriously invaded by education of this type.



Calendar Designed and Executed by Pupils of the Williamsport Grammar Schools, Williamsport, Pa., under Direction of Miss Rena Frankeberger, Supervisor of Art.

Evening schools were conducted last year under the provisions of the enactment of 1911 in 15 different cities and towns at a total expense of $17,572. The enrollment in these evening schools was 2734. The extent of individual instruction offered in the evening schools is implied by the number of teaching positions which was 145. Additional to these phases of industrial education are the courses offered in academies and similar private schools. Eleven of these schools conducted courses in agriculture in 1913-14, 3 had courses in mechanic arts and 3 had courses in domestic arts.

PART-TIME EDUCATION IN PASSAIC, N. J.

The Passaic Board of Education is the only one in New Jersey that has organized a "part-time" scheme. Twenty boys in the Passaic High School are taking school work in alternate weeks for twenty weeks of the school year, and are employed in textile and other industries during the remainder of the year. This employment begins with the second year of the high school, and the boys who are in these courses have received rapid advancement in their industrial work.

The school work is directly related at every possible point to the industries in which the pupils are engaged. Problems are taken from the shop to be used directly in the school. During the present year the number of pupils

is considerably larger than heretofore, and an additional teacher has been employed.

This effort on the part of the Passaic Board of Education is directed toward training leaders of industry. The Board at the present time is seriously considering the introduction of a part-time plan which will call back to the schools the 14 and 15 year old boys and girls for continuation school work four hours a week. These plans are patterned somewhat after the continuation schools of Wisconsin. The Board of Trade of Passaic has appointed a committee to act in conjunction with the Board of Education committee and Assistant Commissioner Carris in formulating a plan for such part-time instruction. It may then receive the approval of the State Board of Education and thus secure for Passaic state aid for the maintenance of such work.

NEW BOOKS AND PAMPHLETS

Problems in Carpentry.

By Louis M. Roehl. 112 pages. Webb Publishing Co., St. Paul, Minn.

This is an excellent book. It presents in a clear way the essentials of carpentry work both in the elements of construction and in the handling of the work in classes. The author has based his work upon the building of full size sections of buildings involving the various forms of carpentry, joinery and construction.

Each problem, such as "'Window Construction," is given complete with itemized material bill, with detail drawings, and with halftones of the finished problem. The drawings and halftones are of exceptional quality and really illustrate the points discussed.

This volume is a distinct contribution to the literature of this subject, and should be in the hands of every teacher attempting such work.

Handbook for Boys (Revised Edition).

Editorial Board, Boy Scouts of America. 422 pages. Price, 50c. Grosset & Dunlap, New York.

"Handbook for Boys" is the official handbook of the Boy Scouts of America. It contains every conceivable kind of lore bearing on the Boy Scout movement and the various activities engaged in by the boys in such an organization.

This volume of complete information may be had at an extremely low price and should be in the hands of every person interested in the Boy Scout work or other work having to do with boys' activities.

How to Cook and Why.

By Elizabeth Condit and Jessie A. Long. 250 pages. Price, $1.00. Harper Bros., New York.

This volume is a simple, direct statement of the principles upon which cooking is based. It is intended to aid the average housekeeper as well as the high school girl. It attempts to make it possible for such persons to use cook books intelligently without becoming slavishly dependent upon them.

The authors have very satisfactorily met the problems involved in such a presentation. The book will be a help to students, teachers, and housekeepers.

Introduction to Machine Drawing and Design (New Edition).

By David Allan Low. 250 pages. Price, 75c. Longmans, Green & Co., London and New York.

Much enlarged, rewritten, and newly illustrated, this volume makes a much stronger appeal than the former edition.

The book has in mind especially engineering students. It is a clear, concise treatment of this technical subject. It has the advantage of a great abundance of well executed drawings both for explanation of the text and for the proper statement of the problems. It would be an especially good book for the technical high school and for the beginning engineering students.

"Planning and Furnishing the Home."

By Mary J. Quinn. 189 pages. Harper and Brothers, New York and London.

This is a suggestive little book on home planning and furnishing with discussions of the proprieties of design for the home.

As stated in the introduction "The main purpose of the book is to show that the family whose purse is slim can nevertheless have a beautiful setting if intelligence, interest, a reasonable amount of time, and the knowledge this book gives can be added to the money available."

Crop Production.

By Clarence M. Weed and William E. Riley. 246 pages. D. C. Heath & Co., Boston.

Agriculture is here taught "'by means of projects," so say the authors. From an educational standpoint a project, we are told, has been defined as "a definite piece of productive work with a real thing in which the end is seen by the pupil from the beginning." Granting the accuracy of this definition, it would seem to mean studying an object before studying the text relating to that object.

Be this as it may, the study of different types of the same plant, the testing of seeds, the germination of seeds, precede study of the formal text. Cultivation of plants, harvesting seeds, care of bulbs, effective treatment of plant enemies are bits of laboratory work scattered thru the principal sub-divisions.

Good drawing in the numerous illustrations, maps showing cereal areas, variety in the "project," or laboratory work, a clear style, render "Crop Production" a well-balanced book.

Household Physics.

By Alfred M. Butler. 382 pages. Price, $1.30. Whitcomb & Barrows, Boston.

In this book, the attempt has been made to eliminate much of the mathematical material found in the ordinary high-school text on Physics.

Instead of the mathematical formulas, the principles are introduced by presenting well-known applications of the principles followed by explanations and other applications. The book is to be commended on the use of non-technical language in its statements, explanations, etc. Many of the common phases of Physics which enter into every day life have been made use of as material for the text. Such subjects as Hot Water Systems, Steam Systems, the use of Gas and Electricity, etc., are the practical topics of discussion.

The volume should find a substantial place in the list of the numerous works on Physics.

Printing and Bookbinding.

By S. J. Vaughn. Second edition, revised and enlarged. 72 pages. Public School Publishing Company, Bloomington, Ill.

This little book has been of such great service to such a large number of teachers that a second edition has been found necessary. It gives in a clear and concise manner that information which is needed by a teacher in order to successfully introduce and conduct a course in printing and bookbinding. The author is a successful teacher of printing and bookbinding and his book gives the beginner the benefit of his experience. The illustrations, together with the text, make the processes understood by a novice.

Lists of equipment and approximate costs make it possible to plan intelligently and to purchase the most complete equipment with a given amount of money.

NEWS AND NOTES

A RECENT report of the Wisconsin State Department of Education shows that the practical courses in the high schools are popular with the students. A gain of 98 per cent has been shown in the number of those taking domestic science in the high schools from 1912 to 1914, while a corresponding gain of 22 per cent is shown in the number enrolled in manual training classes. Agriculture, bookkeeping, typewriting and shorthand have remarkable gains to their credit while Latin classes decreased ten per cent.

CHARLOTTE, N. C. A Manual Training Department has been opened in one of the grade schools.

CINCINNATI, O. Following the establishment of a course in farming for boys of the Woodward High School, a similar course adapted to the needs of girls has been introduced. Lessons in fruit growing, landscape gardening, milk, meat and poultry production, manufacture of textiles, wool, cotton and flax are provided. Trips will be made to the local markets to learn how food products are handled and sold, various grades, prices and uses. Experiments in textiles will be conducted in the school laboratory.

To demonstrate the practical value of Domestic Arts instruction, 26 high school girls at Rock Island, Ill., clothed completely an equal number of little orphan children. The girls each picked out a child, took measurements, selected the material and sewed clothing. The school furnished the material and the girls bought the trimmings with money collected among themselves.

NEWARK, N. J. A course in building materials has been introduced in the Mathematics Department of the Central Commercial and Manual Training High School. The classes are in charge of a practical engineer and teacher, and the topics embrace materials of construction, their manufacture and use, problems of stress and strain, tension, compression, reactions and other elements entering into modern building construction.

The students of the Girls' Industrial School recently filled orders for bread, cake and other products of the cooking department. Orders were also taken for aprons and children's wearing apparel.

PINE BLUFF, ARK. The members of the manual training department of the high school recently undertook the erection of a five-room cottage under the supervision of Mr. Horton, the instructor. The boys performed all the work necessary, with the exception of the bricklaying, gas fitting and plumbing. The training in practical work thru the erection of an actual building, has made it possible for the boys to test the theoretical instruction provided in school.

ROCK ISLAND, ILL. A foundry department has been opened in the Manual Arts High School under the direction of Mr. H. H. Hull. The equipment of the foundry is considered very fine and consists of a complete set of tools and a cupola. The school will make its own flasks at a later date. The present subject raises the number of courses offered to seven.

BUFFALO, N. Y. The following eight weeks' courses are offered in the Technical evening high school: Domestic chemistry, home nursing, electrical construction, machineshop mathematics, mechanical drawing for machinists, roof framing, estimating for carpenters and contractors, wood carving and modeling.

ARGENTA, ARK. The Junior Class of the Domestic Science Department of the high school recently prepared and served a supper to Supt. D. L. Paisley, Principal E. H. White and the members of the school board as an exhibition of their culinary talents. The supper and exhibition were successful and the students were complimented by the members of the board.

OGDEN, UTAH. A course in mechanical and architectural drawing has been introduced in the evening school for the benefit of men engaged in contracting, bricklaying, carpentry, cement work and other lines.

THE VOCATIONAL EDUCATION ASSOCIATION OF THE MIDDLE WEST will hold its first convention in Chicago, February 5th and 6th. For full programs, address Anne S. Davis, Secretary, Board of Education, or W. J. Bogan, President, Lane Technical High School, Chicago.

TOLEDO, O. Under the direction of Mr. Carl T. Cotter, director of Manual Training, the students of the Manual Training classes have begun the construction of birdhouses. The houses will be put in place in the park trees early in the spring and appropriate exercises of dedication will take place on April 3rd.

WORK is to be begun in the near future on a Domestic Science Hall for the Alabama Girls' Technical School, Montevallo, Ala. The building is to be equipped with modern apparatus for the teaching of Domestic Science and is to cost $60,000.

SAN JOSE, CAL. To provide more practical work for the students in the high school, a course in Agriculture has been introduced and the machineshop work has been extended to include automobile construction and repairing. Classes have been formed for young men employed in the mills, garages and shops of the city. Mr. J. R. Case, of the University of Illinois, is in charge of the Agricultural classes.

VOCATIONAL work of an experimental character has been introduced in the following Indiana cities: Anderson, Brazil, Brookville, Indianapolis, Evansville, Fort Wayne, Greencastle, Hammond, Muncie, Poseyville, Richmond and South Bend.

PITTSBURGH, PA. Extension schools to include employees of department stores and factories have been opened under the direction of Mr. O. W. Burroughs, Director of Vocational Guidance. The employers furnish the schoolrooms and textbooks and the school board supplies the teachers.

PEORIA, ILL. An evening trade school has been opened under the direction of Mr. A. P. Laughlin. Mechanical drawing and technical work of various kinds are taught.

A Correction.

IN Mr. Zuppann's article describing rods and rod making in the January issue, the title under Figure 1 should have read: "Detail Drawing of Plant Stand Shown on Page 16, Views Separated," and not "Views of Rod Separated." Under Figure 3, the title should read "Other Side of Rod Showing Views of Heights and Space for Sketch," instead of "Space for Cutting Bill." Under Figure 5, the title should read: "Detail (greatly reduced) of a Dressing Table," and not "Rod of a Dressing Table."

Death of Mr. Winter.

Mr. Alfred R. Winter, head of the Continuation Schools and Director of Vocational Guidance for the public schools of Boston, Mass., died in a local hospital on January 3rd, after an illness of three months.

Mr. Winter was born in Mansfield, Mass. He graduated from the Mansfield high school in 1892 and from the Bridgewater Normal School in 1897. He also spent some time at Brown University, receiving a degree in 1901.

He served in the capacity of principal, submaster and master of a number of public schools. In March of last year he was appointed as head of the continuation schools and it was confidently predicted that he would make a mark for himself.

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

Bezel Material.

Rockford, Illinois. Q:—What is best to use for bezels for silver rings? Where can I buy such material?—*C.*

A:—Gauge 26 or 28 Sterling Silver is the bezel material needed. It can be had from Thomas J. Dee & Co., Mallers Building, 5 So. Wabash Ave., Chicago. They have put out a little circular giving information and prices.

Books on Woodworking.

Indiana. Q:—Please give me the names of some good books on beginning woodwork.—*R.*

A:—*King's Elements of Construction,* (American Book Co., Chicago), *Griffith's Essentials of Woodworking,* (Manual Arts Press).

Laying Out Rooms.

Illinois. Q:—In our new Township High School building, we have a room for woodwork. It is 24 by 60. We shall need only sixteen benches. Would you leave it all in one room or cut off a small room for supplies, gluing, finishing, etc.?—*J.*

A:—By all means, have a separate room for your stock, finishing, gluing, supplies, etc.

Glues.

Indiana. Q:—Kindly give me the name of a good cold glue.

A:—LePage's Glue and Imperial Glue are both first class cold glues.

Art Glass and Celluloid.

Oshkosh, Wis. Q:—Where can I procure lead and copper strips used in joining art glass?

Where can I procure transparent celluloid?

A:—The nearest sources of supply for the articles mentioned are:

Lead and Copper Strips for Art Glass—National Art Glass Works, 594 National Ave., Milwaukee, Wis.

Celluloid—Cream City Trimming Co., 73 Juneau Ave., Milwaukee, Wis.

Glazier's lead may, also, be purchased from the manufacturers, E. W. Blatchford Co., 70 North Clinton St., Chicago, Ill. Brass strips can be had from the Chicago Brass Co., Chicago, Ill.

The producers of celluloid are the Celluloid Co., New York City, The Arlington Co., 725 Broadway, New York City, and Whitehead & Hoag, Newark, N. J.

Printing Presses.

Y. S. Q:—Will you kindly tell me where small hand printing presses suitable for printing small cards can be purchased? We wish to do simple printing in the lower grades but cannot afford a large press.

A:—The Golding Mfg. Co., of Franklin, Mass., manufactures a complete line of small presses ranging in price from six dollars up.

A Pun?

D. F. Q:—Can that foolish Mr. Frills really draw a salary?

A:—We wish to inform you that Mr. Frills is not the kind of artist that draws things; neither is he the kind that works with colors, and dyes; he is the kind that makes faces, and busts.

Training Teachers.

A. G. Q:—Are there any schools in this country in which a man who has not attended high school, but who has learned a trade, can prepare himself to be a teacher of manual training?

A:—There are several such schools to which persons, especially mature men and women who have worked for some years in a trade, are admitted. The University of Wisconsin thru the Extension Division conducts a department in Milwaukee for this purpose. Mature men who are experts in their trades, may attend the classes, which are conducted in the evening. Provision is made for the students to do directed teaching in the evening schools of Milwaukee and vicinity.

Books on Jewelry.

To the Editor:

Your correspondent from Rochester, N. Y., asks, in your January number, for the names of some good books on jewelry. As one who has done considerable amateur jewelry work, and has learned it all from books, may I recommend "Silverwork-Jewelry" by Wilson (Second Edition), D. Appleton & Co., New York, and "Simple Jewelry" by Rathbone, Van Nostrand Co., New York? Both are excellent. Yours truly,

W. M.

New York City, January 2, 1915.

MISSOURI COMMISSION REPORT.

In November, 1913, the Missouri State Teachers' Association appointed a special Committee on Industrial and Vocational Education. The committee was composed of Joseph D. Elliff, Lewis Gustafson, J. C. Wright, Myrtie C. Van Deusen, and Clara E. Graham.

As a result of the careful investigation and consideration of all the information secured, the Committee submits the following conclusions:

1st. That it is desirable and necessary that there should be a system of vocational education established thruout the state of Missouri, this vocational education to cover: Day, part-time day, and even vocational schools, departments, and classes, for instruction in the industries, agriculture, household arts, and commercial pursuits; and to include day prevocational classes in these subjects.

2nd. That it is impossible to secure the establishment and maintenance of such a system of vocational education without state aid.

3rd. That state aid cannot be granted from the general revenues of the state for the reason that these revenues are now inadequate to meet demands already made upon them. Neither can it be obtained from the permanent school funds, as these funds are needed to maintain existing public schools.

4th. That in order to secure an increase in the taxes an additional state levy must be made; this levy must be secured thru a constitutional amendment.

5th. That such a constitutional amendment should be secured, and a levy of not less than one mill should be made for educational purposes, of this amount not less than one-eighth, increasing to one-fourth, as needed, to be devoted exclusively to the purposes of vocational education.

6th. That for the proper administration of these funds and the proper administration of the other educational affairs of the state, the State Board of Education should be reorganized and taken entirely out of partisan politics.

7th. That after these constitutional amendments have been secured there should be passed in the legislature a bill authorizing the state to pay two-thirds of the actual salaries of teachers and supervisors and directors engaged in this vocational education.

The law proposed is very similar to the Indiana Vocational Education Law.